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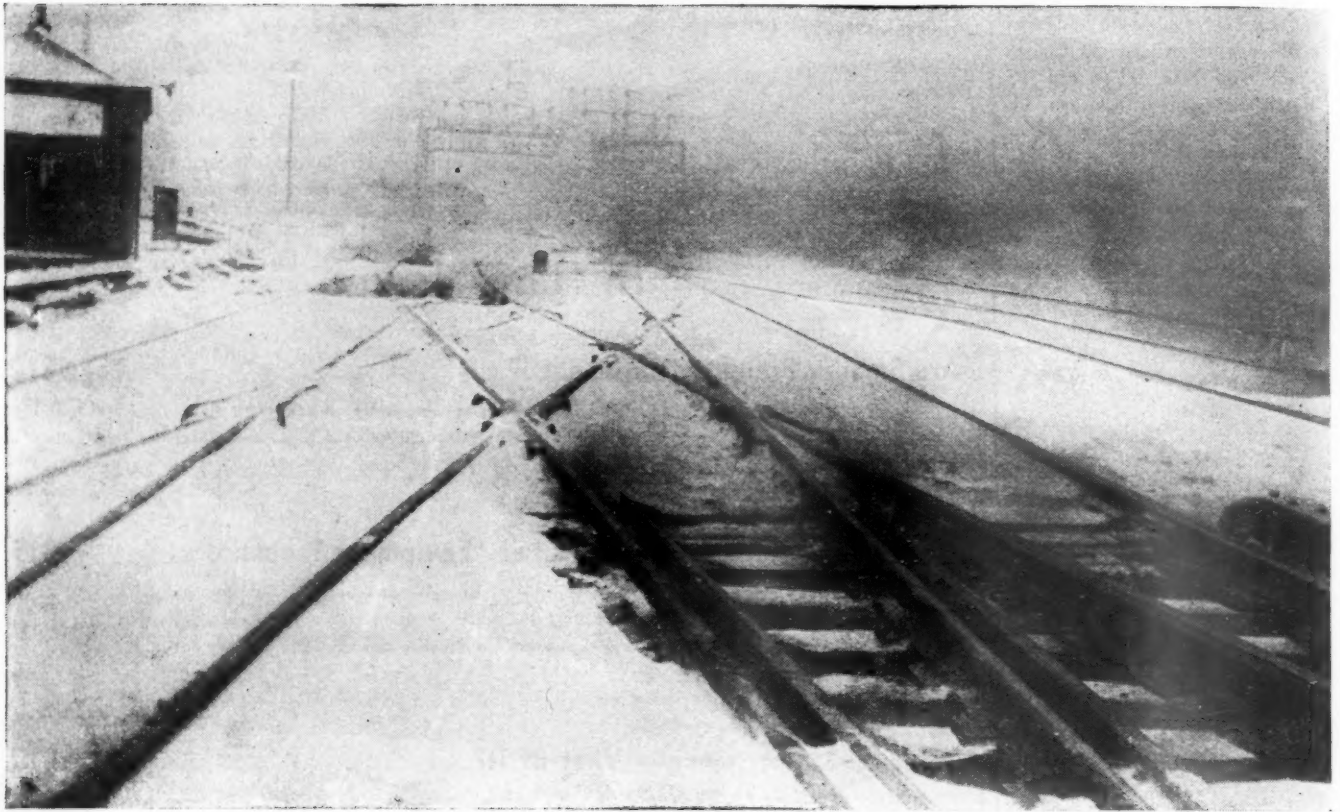
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WHEN WINTER COMES



keep switches operating with Winter King Switch Heaters

THE suddenness with which blizzards strike and the seriousness of the traffic delays and tie-ups which they cause have long been a source of great trouble and expense to railroads. Freedom from snow-clogged and frozen switches and the resultant costly delays to traffic may be had by the use of Winter King Switch Heaters.

Winter King Switch Heaters keep switch points free from ice and snow and switches operating in the worst conditions of winter weather. Further, these heaters reduce the cost of snow removal. Where Winter King Switch Heaters are installed, the cost of snow removal is about one-third of that with the hand method. One man can take care of about 100 heaters, eliminating entirely extra labor.

BETHLEHEM STEEL COMPANY
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The Winter King Switch Heater is made of copper-bearing steel and has a fuel chamber with a capacity of about $1\frac{1}{2}$ gals., sufficient for about 9 hours of ordinary operation. A flange on each side of the wick opening maintains the proper distance between the heater and the bottom of the switch point. Heaters are shipped with the wick installed, ready for immediate use. It is only necessary to place the heater beneath the switch point, fill the fuel chamber with kerosene and light the wick.

RAILWAY AGE

The Government Planners and Business

The excessive, and even absurd political and economic partisanship which has been aroused by the "new deal" policies of the national administration could not be better illustrated than by the controversy which has raged and is still raging regarding what has been the prevailing trend of business since last summer. The *Railway Age* has no concern whatever with the political phases of this controversy. This paper is, however, concerned from an economic and business standpoint with the facts regarding changes in business in general, and in the railroad business in particular, and with the causes of these changes. Now, railroad car loadings are the best single measure of the total volume of production and commerce and they demonstrate beyond any question, first, that the trend of general business was upward during the last one-third

which the gross earnings and net operating income of the railways in October compare with those of the three preceding months. Almost invariably railway earnings in October are the best in any month of the year. In 1933 not only was net operating income less in October than in August or September, but for the first time in twenty years, excepting under government operation in 1918 and 1919, it was less than in July. Furthermore, both gross earnings and net operating income were less in October, 1933, than in October, 1932.

Increased Employment or Increased Business?

The partisans of the "new deal" policies have thus far failed squarely to meet and explain such facts. They have sought to prove that these policies have im-

AVERAGE WEEKLY CAR LOADINGS

			Percent of		Percent of	GROSS EARNINGS		NET RAILWAY OPERATING INCOME	
	1925-1929	1932	1925-1929	1933	1925-1929	1932	1933	1932	1933
Jan.	901,164	567,469	63.0	477,624	53.0	\$275,370,628	\$226,555,138	\$11,713,613	\$13,265,722
Feb.	924,622	561,331	60.7	489,495	52.9	267,272,286	211,612,904	22,042,614	9,854,884
Mar.	957,889	570,168	59.5	460,301	48.1	290,028,926	217,599,458	32,289,300	10,548,001
April	958,402	554,577	57.9	500,949	52.3	267,816,536	224,877,399	20,623,929	19,041,489
May	1,025,566	521,939	50.9	531,960	51.9	254,741,234	255,255,752	11,950,652	40,693,073
June	1,001,905	491,589	49.1	566,345	56.6	246,236,756	278,311,083	12,652,515	59,483,185
July	1,009,839	484,427	48.0	621,763	61.6	237,813,054	293,708,299	11,596,852	64,307,068
Aug.	1,077,544	516,270	47.9	625,678	58.1	252,102,171	297,017,776	28,368,387	60,978,216
Sept.	1,103,860	561,150	50.8	635,679	57.6	272,473,364	292,147,177	49,646,867	60,936,370
Oct.	1,156,751	631,621	54.6	653,493	56.5	298,461,507	294,341,594	63,839,316	57,264,780
Nov.	1,031,517	548,802	53.2	591,524	57.3	253,574,863		34,179,122	
Dec.	875,258	497,366	56.8			246,062,199		32,856,895	

of 1932; second, that it was downward during the first quarter of 1933; third, that it was upward thereafter almost to the end of July, and, fourth, that it was downward during August, September and October, 1933. The trend apparently started upward again in November, but an especially sharp contrast is presented by the prevailing trends during the fall months of 1932 and 1933.

The statistics which prove these statements are presented in an accompanying table. One of the most remarkable of the facts they disclose is the way in

proved business, first, by showing that employment and payrolls have increased since last March, and, second, by showing that general business has been better within recent months than it was last March. An increase in employment does not, however, prove an improvement in general business. The only proof of an improvement in general business is an increase in the volume of production and commerce, and no increase in employment and payrolls can long be maintained in spite of a downward trend of production and commerce. Furthermore, the trend of general business is

more important than the volume of it during any given period because the trend shows whether it is or is not improving. As a result of the downward trend since July business has been relatively worse in every month since than it was in July. If the upward trend indicated in November is maintained it will soon be substantially better.

Let us contrast in some detail the difference between the trends in the second halves of 1932 and 1933, as indicated by the statistics in the accompanying table. In July, 1932, car loadings had declined until they were only 48 per cent of what they averaged in July, 1925-1929, and gross earnings and net operating income were the worst of last year. By October car loadings had increased until they were 54.6 per cent of the 1925-1929 average, gross earnings were almost \$298,500,000, as compared with less than \$238,000,000 in July, and net operating income was \$63,840,000 as compared with only \$11,597,000 in July. In July, 1933, as a result of increases that had occurred during the four months preceding, car loadings were 61.6 per cent of the 1925-1929 average, gross earnings were almost \$294,000,000, as compared with less than \$218,000,000 in March, and net operating income was \$64,307,000 as compared with only \$10,548,000 in March. Now, observe what has occurred this year since July. A normal increase in car loadings from July to October is 15 per cent. In 1932 the increase was 30 per cent and in 1933 only 5 per cent. While in July loadings were 61.6 per cent of the 1925-1929 average, in October they were only 56½ per cent of that average. Gross earnings increased 25 per cent between July and October, 1932, while between the same months in 1933 they increased only a fraction of 1 per cent. Net operating income increased 450 per cent between July and October, 1932, and declined from \$64,307,000 to \$57,265,000, or 11 per cent, in 1933.

Why Have Business Trends Changed?

In November car loadings were 57.3 per cent of the 1925-1929 average, as compared with only 56½ per cent in October, a tangible improvement. But why has the trend of general business changed so markedly four or five times within the last sixteen months? Why did business improve during the last one-third of 1932? The present revolutionary economic policies were not then in effect. The improvement must, therefore, have been due to natural economic causes. Why did business again improve from March to the end of July, 1933? During all of this period the only legislation in effect that might have affected natural economic tendencies was that imposing restrictions upon withdrawals from the banks, that legalizing beer and that providing for reductions of expenditures of the federal government. The revolutionary recovery legislation was on the statute books during only a small part of the time and practically none of it was in actual effect. Why was the trend of general business mark-

edly downward during August, September, and October? The revolutionary recovery policies were rapidly being put into effect during this period. Is this the explanation of the downward trend of business, or what is the explanation?

The *Railway Age* always has advocated less government in business and more business in government. It always has believed that while business men, small and large, and the capitalistic system as conducted by them, have great short-comings, the country is much more likely to prosper under business management of business than under government supervision of business. The changes in the trend of business during the last sixteen months, and especially the trend that has prevailed since last July, have not shaken this belief, but strengthened it. If those who have assumed responsibility for the adoption and administration of policies which have put more government into business than ever before are going to prove that these policies are desirable, they will have to make more progress in improving business than they have made during the last four months.

Speeding Up Production and Commerce

The widest practicable spreading of employment during a period of depression is desirable. A mere increase in the number of persons employed, however, as recent experience has only too conclusively demonstrated, does not necessarily increase production and commerce. But national wealth and income are created by production and commerce and can be increased only by their increase. Therefore, the means which should be employed by government and business to terminate a depression are policies having the purpose and effect of increasing production and commerce. In every industrial depression in history, including the present one, the greatest decline in activity and employment has been in the "capital goods" industries. Therefore, all intelligent measures for the termination of a depression will have as their principal objective the revival of the capital goods industries. During the period from March to July, 1933, when a revival of business was well under way, the most marked increases in activity and employment were in the capital goods industries. Since July, when, until within recent weeks, the trend of general business has been downward, the most marked decline of activity has been in the capital goods industries.

One means that has been advocated for the purpose of stimulating the revival of the capital goods industries has been that of government loans to the railways on easy terms, the money to be used not only in increasing employment by them, but in increasing their purchases from manufacturers. The ways of government in dealing with public works and private industry are, however, quite different. The government will unhesitatingly invest hundreds of millions of dollars in public works such as highways

and inland waterways which are not needed and from which little or no return probably ever will be derived by the taxpayers, but it becomes exceedingly meticulous and exacting in fixing the terms on which it will make loans to an industry such as the railroads from which the taxpayers are almost certain not only to get interest, but to recover their principal. In consequence, although certain loans that were to be made by the Public Works Administration to the railways were announced some weeks ago, none actually have as yet been made, and some of the terms being demanded by the government are adapted to preventing the loans that are made from being as large as has been expected.

The Trouble With Government

The trouble with government in business is much the same under the new deal that it always has been in the past. Government is bureaucracy. Bureaucracy always wants to dictate its own terms and always tangles itself up in so much red tape that it takes several times as much effort and time for it to accomplish anything as are required to accomplish the same thing in private business. Furthermore, the United States is an enormous country, with a huge population and multifarious business activities, large and small. Consequently, a government "planned economy" for business is more likely to prevent business from being done in this country than in any other country in the world. The "planned economy" is working, but there is no evidence as yet that it is stimulating the improvement of business, and much evidence that it is retarding improvement. The government planners should either speedily begin to do the job of running business better, which they have so gladly undertaken, or give business men more chance to run it.

Two Noteworthy Bridge Failures

One of the fundamental obstacles confronting the railways lies in the fact that the magnitude, varied character and extended nature of their fixed properties impose problems incident to the maintenance of adequate standards of upkeep that are not encountered in any other industry. Efforts to provide adequate supervision for these far-flung properties has resulted in the adoption of the divisional plan of organization, but increasing complexity of construction, giving rise to the need for specialized knowledge, has led to the separation of the work of design and construction from that of maintenance. With this, of course, has come the need for a careful subdivision of responsibilities and, in the main, this has been rather well defined, although it is not surprising that the system sometimes breaks down with disastrous results.

This is illustrated in the reports of the Bureau of Safety of the Interstate Commerce Commission on two train accidents resulting from bridge failures, which were abstracted briefly in the *Railway Age* of December 2, 1933, page 794. In the accident at Anacostia river, a pier supported on gravel foundation was undermined by an unprecedented stream flow due to extreme tide fluctuations during the course of a severe tropical storm. In the accident near Hargis, N. M., a bank block abutment collapsed when the toe of the embankment, that was depended upon to protect it from undermining, was washed away.

The designer of a bridge substructure, to avoid the extravagance that would attend efforts to meet remote contingencies, must assume that watchfulness on the part of the maintenance forces will afford adequate protection against the development of the exceptional combination of circumstances which the structure cannot withstand. The maintenance officer, on the other hand, cannot be conversant with the peculiarly vulnerable features of each structure in his care, unless these are made known to him. Otherwise, he must rely entirely on common sense and judgment founded on practical experience.

In the case of the Anacostia river bridge, which was not on pile foundations, the Bureau of Safety ascribes the undermining of the pier to failure to take periodic soundings, but whether this lapse should be charged definitely to the division maintenance forces or ascribed to a breakdown of the system for the subdivision of responsibility was not made clear. In the case of the abutment failure near Hargis, the maintenance forces may not have been in a position to realize the extent to which the stability of the abutment was dependent on the integrity of the embankment, but they should have known what was apparent to the local residents, that the toe of the embankment was being subjected to serious erosion. But here again we are confronted with the question as to whether this was due to neglect on the part of individual officers or the result of expanded districts which made it physically impossible for them to cover their territories with the frequency or thoroughness necessary. Attention was directed, also, to the failure to take cognizance of the grave situation created by the construction of a highway bridge immediately upstream from the railway bridge in a location that directed the stream flow directly at the toe of the embankment which protected the abutment.

The railways enjoy an enviable reputation for the safety of their bridges. Train accidents due to bridge failures are exceedingly rare. But the circumstances attending the two accidents cited above, both of which occurred within a week, serve to stress the importance of adequate supervision and point the need for a thorough-going study of the division of responsibility, to insure that the necessary co-ordination of design, construction and maintenance is effected.

Are Smaller Freight Cars Needed?

Will 10-ton equipment regain traffic?—Can it be used in present operation without destroying efficiency?

THE small freight car, of about 10 tons' capacity, has been suggested so frequently during the last few years that it is pertinent to inquire whether smaller freight cars are really needed. The answer to this question depends upon many factors. Do shippers demand a smaller freight car? Will it meet traffic needs? Is it adaptable to present railway operating practices? Will it recover traffic now lost to the trucks?

Since the World War, the railroads have greatly perfected their service by reducing delays in transit and by expediting deliveries. As a result, there has been brought about a modification of the long-established seasonal buying habits which were adapted to the large carload and to the delays incident to the marshalling of cars for movement in long, heavy trains. Now, merchandise is ordered in smaller quantities and inventories are kept at a minimum. Hand-to-mouth buying demands the frequent movement of small lots at high speeds. This situation has created a demand for expedited delivery. The growing appreciation of the advantages of the movement of merchandise in smaller quantities on more frequent orders has aided the development of motor transportation.

Since smaller quantities are involved, the small car is concerned primarily with the l.c.l. business of the railroads and the traffic handled by the trucks. All of this business is not, however, adapted to the small car, for much railroad l.c.l. traffic is too bulky and much of the truck traffic moves that way because of the convenience of delivery. The actual tonnage involved is difficult to ascertain, because truck tonnage is not available. It is definitely known, however, that in 1932 the railways handled 15,233,791 tons of l.c.l. freight, and it is estimated that the railways last year lost more than \$500,000,000 because of the diversion of rail traffic to trucks, the figure being based upon detailed surveys in 17 states. Joseph B. Eastman, federal co-ordinator, in a recent

discussion of l.c.l. traffic, said, "Our figures, which are approximations, and which relate only to movements by land and which do not include the parcel post, indicate that in 1932 the railroads carried 32 per cent of the package freight; forwarders moved 11 per cent, the bulk of which went by rail; express companies moved 3 per cent; and trucks handled 54 per cent. These figures are based on tons and not on ton mileage."

Many Commodities Can Be Moved by Small Cars

That portion of the freight traffic that can be handled in small cars is made up of a variety of commodities, including manufactured products, grain products and farm products. The shippers and receivers of these products are numerous and are widely scattered throughout the country. The need for the small car is most clearly demonstrated by the large number of wholesale grocery and dry goods houses that receive products in limited quantities and reship them in still smaller amounts to retail stores; the large number of farmers who ship their products to market in small quantities; the large number of grain elevators that receive small shipments, etc.

Does the shipper demand the small car? No concerted action has yet been taken by shippers. However, the interest that some of them have expressed upon the completion of the construction of the only small car that has yet been built in the United States, a refrigerator car, is enlightening. A packer said, "The small car is interesting in that it is a departure from the present program of car builders of constantly increasing the size of equipment and in that the refrigerator truck has come to be recognized as a convenient means of handling packing house products. Packers have been considerably troubled with light tonnage, particularly in their route cars and, in some cases, have resorted to the truck to escape the heavy charges due to the prevailing minimum weights over the rail routes."

A candy manufacturer said, "I feel that there is a possibility in the use of the small car for shipping chocolate goods in the summer time. Jobbers are rapidly turning to refrigerated rooms for keeping chocolate and nut goods from spoiling in the summer time and it seems that a small refrigerator car might be adaptable to this plan." Another candy manufacturer has said, "We ship 1,000,000 lb. of candy a month by truck and will use railroads if we can secure the small car at a reasonable rate."

A fruit grower was of the opinion that present railroad equipment is heavy and lacks the flexibility necessary to meet truck competition. A manufacturer believes that 10,000 and 12,000-lb. shipments comprise the major portion of the traffic lost by the railways and suggests that the small car, or lower minima, will regain it. A packer states that 23 per cent of his orders involve 10,000 to 12,000 lb., while another places the percentage of his business in orders of that size at 34 per cent.



The Small Freight Car with an Adjusted Carload Rate Will Meet the Requirements of Small Shipments

Since the trend in car construction in the United States has always been in the direction of larger equipment, the introduction of the small car is often interpreted as a step backward. Because of its past reputation and because of a lack of data—only one small car being operated on American railways—mention of the small car is usually met with a variety of objections.

The most frequent objection is that the car will not stay on the rails at high speed and cannot, therefore, be operated in trains of large cars. Since no small cars are operated in trains of heavy equipment in this country, it is impossible to answer the objections with records of performance. However, in Germany, Russia, England and other countries, the small car has been in use for many years and often is operated at high speeds—sometimes in passenger trains. The small refrigerator car, which was built by the North American Car Corporation, Chicago, for use by the Hormel Packing Company, Austin, Minn., (described in the *Railway Age* of November 19, 1932, page 698), and which has traveled almost 20,000 miles has been operated in trains moving as fast as 65 miles an hour between Austin and Chicago, and has traveled as far south as Dallas, Tex. Tests of its riding quality show that the vertical vibration of its floor is considerably less than that of a standard refrigerator car.

Another objection offered in argument is that small cars are not adaptable to all types of lading, and being few in number, will seldom be in the vicinity of available loading when required. This is no different, however, than now prevails. The railroads have much special equipment which is designed for particular shipments and it is often necessary to return these cars great distances to the point of available loading. The 36-ft. car is another striking example. Because the small number of cars of this length does not meet the demand—they are not always near the point of loading—the carriers have reduced the minimum on the 40-ft. car and spot it instead.

It is also contended that a large number of small cars will clutter up the terminals and yards and retard shipments. It is difficult to assume that the modern freight-handling facilities of the carriers are not today adequate to handle far more traffic than they did in the peak year 1926 or in 1929, when carloadings totaled 52,827,925 cars. It is also difficult to believe that small car operation would develop an operating problem too difficult for railway personnel to solve. On the contrary, the small car possesses advantages which might simplify its operation. It can be loaded and be prepared for movement in less time than a large car. Consequently, it may be possible to dispatch it more promptly. Another feature to be considered is the fact that since a car contains only one shipment, it can be placed on a side track and be unloaded by the consignee. With small cars, this may mean less freight handling by the railroads and more rapid service to the buyer.

Are Large Cars More Economical?

It is contended also that it is more economical to operate large cars than small cars. This contention cannot be challenged when the cars are loaded to capacity, but if they do not carry full loads, the ratio of tare to loading increases and economy is sacrificed. According to figures presented by Federal Co-ordinator Eastman, in a recent address, the average loading of carload freight is about 34 tons per car and the average loading of l. c. l. freight in 1932 was less than 2 tons per car. Yet, the type of car which is built to meet the requirements of carload freight is also being used for these small lots of package freight. In an article, "Will



New Standards for Flexibility and Convenience Have Enabled Trucks To Take Much Traffic from the Railways

Lighter Freight Cars Save Money for the Railroads?", published in the *Railway Age* of September 2, 1933, page 339, it was estimated that only 32.4 per cent of all cars are loaded to full capacity.

During discussions of the small car, the question is often asked, "Why introduce the small car when other devices may be employed?" The devices usually referred to include the container car, the compartment car, the flat car designed to handle loaded truck bodies and the flat car which carries loaded motor trucks. Sometimes a reduction of the present minimum on cars is also advocated.

The container car, discussed in the *Railway Age* of November 25, pages 751-53, is being used effectively by several railroads. Its success thus far, however, has not been such as to afford conclusive evidence that it is superior in all respects to the small car. Opponents of the small car contend that if small cars were in service, they would be scattered over the country. The use of containers has been confined to systems and to points which have cranes and facilities for loading and unloading them and as a result, the containers are not widely scattered. Should all railroad shipping points be equipped with cranes and facilities for handling them—a costly undertaking—and container service be extended to these points, containers also would be scattered. The same objection applies to the container and the small car.

Extensive use of the container means a large investment in containers and in cranes and facilities with which to load and unload them. It also entails the movement of empty containers and of empty cars and cars from which some containers have been removed enroute. Under such conditions it would not seem that extensive container operation is more efficient and economical than small car operation.

The conditions surrounding the use of flat cars designed to handle loaded truck bodies are similar to those confronting the extensive use of containers. No cranes are required to handle the bodies, since they are so designed that a windlass on the truck can roll them on and off cars, but their extensive use would create a similar situation in that the bodies would be scattered over the country and the empty body and car movement would be present. In addition, there is the investment in motor trucks with which to move the bodies to and from the railroads.

Are Compartment Cars Better?

Compartment cars, some of which are operated by the Chicago & North Western between Chicago and Waukegan, Ill., Kenosha, Wis., Racine and Milwaukee, have been successful in recapturing some freight traffic. The

North Western cars, which were placed in operation on May 6, 1932, are automobile cars which have been fitted with interior partitions to provide four freight compartments, two on each end. The two partitions extend across the width of the cars, being situated at the sides of the door opening. Additional partitions running lengthwise of the car bisect the spaces enclosed by the crosswise partitions. Access to the compartments is had by means of doors 7 ft. high and 4 ft. $1\frac{1}{16}$ in. wide, which form a part of the crosswise partitions. The compartments themselves are 17 ft. 8 in. long and 4 ft. $4\frac{3}{16}$ in. wide, and 10 ft. high.

The charge for the transportation of freight in these compartments is based not on weight but on a flat rate of \$15 per compartment. Furthermore, there are no packing requirements of any kind, the railroad assuming no responsibility for loss, damage or injury to the property transported due to insufficient packing or improper loading in the compartment. The compartment rate is based upon the shipper signing a release to \$100 valuation for the freight in each compartment. When the release is not signed, the rate is \$16.50 per compartment.

Ordinarily, the cars are operated only from team track to team track and the shipper and the consignee load and unload the freight at these team tracks. There is provision, however, that if three or four compartments are loaded from one consignor to one consignee in one day and one bill of lading, the railroad will place the compartment car at any industry located on an industrial or private sidetrack served by the road for loading or unloading without additional charge. The compartments are locked or sealed by the shipper, the railway sealing only the outside doors of the cars.

While the compartment car has been successful in limited areas, it cannot be assumed that it is better adapted to extensive use than the small freight car nor that its operation is more economical. The compartment car is a special car that can be used only for certain shipments. Economy is lost when the car moves with one or more empty compartments. Some compartment cars are equipped with a removable partition so that when they are taken out, the car is no longer a special car and can be used for more than one type of lading. This type of car is more flexible, but in extensive operation its economy is also lost if all compartments are not used. In addition, space occupied by the partitions when stored in the cars prevents maximum loading and increases the ratio of tare to lading.

Handling Trucks and Truck Bodies on Flat Cars

Another innovation used to recover freight traffic is the hauling of truck or truck bodies on flat cars. In 1931, the Pennsylvania, the Baltimore & Ohio, the Central of New Jersey and the Delaware, Lackawanna & Western instituted the transportation of truck bodies, loaded or empty, between Jersey City, N. J., Philadelphia, Pa., Baltimore, Md., Richmond, Va., and Scranton, Pa., on flat cars. The purpose of the service was to meet truck competition on the highways by combining the economy of rail transportation for the road haul with that of the truck for terminal delivery. Under the arrangement, truck bodies are loaded by the shipper, hauled by motor truck from his place of business to the receiving station of the railroad where they are transferred from the truck to the railroad car and moved in railroad freight service to destination. Upon arrival at destination, they are transferred from the railroad car to a motor truck and hauled to the consignee's receiving platform.

On October 18, 1932, the Alton put into effect a

tariff covering the hauling of loaded motor trucks on flat cars between Chicago and East St. Louis, Ill. Under this arrangement, both shippers operating their own trucks and commercial motor truck operators may utilize railway service for the transportation of the trucks and their loads from terminal to terminal and have the trucks available for pick-up and delivery service without additional loading and unloading. The rates in effect vary with the length of the truck to be carried as follows:

Length of Truck	Rate
20 ft. or less	\$30
20 ft. to 21 ft. 11 in.	35
22 ft. to 23 ft. 11 in.	40
24 ft. to 29 ft. 11 in.	50
30 ft. to 34 ft.	60

Trucks which have moved one way loaded may be returned empty at one-half the rate for the movement of the loaded trucks.

The Alton has installed ramps at its East St. Louis team tracks and its Harrison street team tracks in Chicago, by means of which trucks are loaded on to the

In the Issue of December 23

This will be the first of two articles on faster freight trains. It will discuss the extent to which the speeding up of freight trains is necessary to meet truck competition. It will also describe the high-speed freight service offered by certain railroads, the operating arrangements used in connection with fast schedules and the special car and locomotive equipment assigned to these trains.

flat cars and unloaded from them. The loading and unloading operations are handled by the shipper. The trucks are fastened to the flat cars by special devices developed by the mechanical department of the railroad.

Whether it is better for the railroads to haul trucks or truck bodies on flat cars than for them to introduce small freight cars depends on several factors. The first consideration is what the traffic will bear. Since truck operating cost per ton per mile is low, the estimated average of all trucks being five cents per ton per mile, the railroad rate must be such that it offers an inducement to operators. Assume then, an extensive operation of truck cars with a rail rate low enough to attract some trucks. Would the possible revenue received by the railroads under such operation exceed the revenue that might be earned through the operation of small cars?

It has been suggested that instead of adopting small cars, the railroads reduce the minimum carload weight and the minimum weight requirements for present equipment. No doubt much traffic would return to the rails if the minimum carload requirements were made exceedingly low, say, 12,000 lb. for the minimum carload weight. However, such action would increase the ratio of tare to lading, increase the number of cars required to move the traffic and increase the problems of operation. The result would be increased costs per ton-mile.

Is It More Advantageous to Enter Trucking Business?

Another suggestion is that instead of using small cars the railroads go into the trucking business and provide carrier liability. This is based on the theory that trucks are used because they afford quick and convenient delivery. At a steel mill, for example, 5 to 10 per cent of the output is moved by truck in as small as

(Continued on page 824)

Steel and Its Relation to the Railway Equipment Problem*

Competition is directing the efforts of designers toward lighter equipment—New steel products offer opportunities for savings in weight

By F. D. Foote

Assistant to Vice-President, United States Steel Corporation

A PROMINENT figure in the car building industry was asked recently if he thought railroad equipment was destined to be much lighter. He said that it probably was, and then added, "We built it heavier because it was too light, now we'll build it lighter because it's too heavy." This, when analyzed, proves to be a true statement, and a rather amusing one. All types of equipment were too light, or rather too weak and too small, not so far back in railroad history.

This fact needs little elaboration. Passenger equipment, very largely of wood, was too light for the protection of passengers in case of derailment or collisions and the fire hazard constituted a spectre railroad executives wished to avoid. So steel gradually supplanted wood in both passenger and freight car construction, as it did at about the same time in buildings, ships and construction in general.

Thus a new era for rolled steel was at hand and this fact contributed substantially to the prosperity of the railroads and the country generally. To manufacture a ton of steel, five tons of raw materials had to be transported; hence with the ever increasing demand, the rolled steel industry was placed in the forefront as the largest shipper, among manufacturing industries, on the railroads of the country. Moreover, the steel consumed by the railroads alone, amounting to an average of approximately 20 per cent of the total, contributed handsomely to the rapid expansion of the steel industry. Could a better reason be advanced for the interest each of these two industries should manifest in the other's destiny? Perhaps it will prove a wholesome stimulant for both of them that certain phases of the railroad business are now confronted with formidable competition.

Excessive weight above strength requirements in steel structures, provided for stiffness and as a defense against corrosion, has made a generous contribution to the traffic of the railroads and the tonnage demand for steel. Where, then, in the economic scheme of things does the law of diminishing returns set in for these two reciprocating industries, if lighter designs are to be adopted generally in all equipment and structures, railroad and otherwise? This is a problem for the economists to evaluate. To what extent can railroad equipment be lightened in weight and safely operated at high speeds without radical changes in the character of railroading? Railroad engineers and operating officials must supply these answers.

Revolution is a popular word these days. One hears it mentioned frequently in connection with the railroads, and especially with reference to railroad equipment. It

is claimed that faster and more frequent service is demanded at lower cost. In some considerable measure this may be true but like many claims, made in revolutionary periods, these should be carefully scrutinized in the light of facts, in order that they may not assume undue proportions.

It is true that a marked change has taken place in certain phases of the railroad business. Since the year 1920, passenger traffic has declined 63.7 per cent. Part of this loss, to be sure, is due to the depression but even in 1929 the volume of passenger traffic was 33.6 per cent less than in 1920.

The greatest decrease in passenger traffic has occurred in short distance, day coach travel. It is commonly believed that this is due principally to competition by buses, but statistics of travel by rail and by bus indicate that such is not the case. From 1926 to 1930, the loss of passenger traffic by the railroads was three times as great as the gain made during the same period by the bus lines.

For several years passenger travel by private automobile has amounted to as much as 10 to 15 times the decrease in traffic on the railroads, accepting the traffic of 1920 as the peak. The advent of the private automobile has caused a substantial increase in travel but it is also responsible for a large part of the loss the railroads have suffered in passenger traffic. It seems obvious, therefore, that the railroads should provide something different and compelling, in service to the public; something clearly making it an advantage for the automobile owner to do a larger part of his traveling by rail.

Freight traffic has not shown as great a decrease as passenger traffic but a radical change in trend is evident. Prior to 1920 the revenue ton-miles of the railroads doubled approximately every 12 years. From 1920 to 1929, two peak years, the increase was only nine per cent.

We will not speculate in this discussion upon what effect fair and reasonable regulation of highway and waterway transportation might have upon the economics of the railroad problem. Certainly speed is not a factor in the impressive amount of traffic which is carried by inland waterways. It is contended by railroad officials that with some regulation of these waterways and some freedom on the part of the railroads, now forbidden them, to make competitive fourth section rates, a volume of business could be restored to the rails from the water, which would be exceedingly helpful in offsetting the traffic which has been diverted to the highways because of better short-haul trucking service.

It is interesting to observe the close relationship exist-

* The abstract of an address delivered before the American Society of Mechanical Engineers (Railroad Division) at the Annual Meeting held at New York, December 5 to 7, 1933.

ing between railroad competition and the degree of change demanded in type and weight of equipment. Where the competition of the trucks, buses and private cars bites deepest, the most radical changes in the design of equipment seem to be in order. For instance, the familiar local passenger train will probably be replaced by the self-propelled rail car. This has already come about in numerous instances. The change here is absolute and the designer can take a free hand. Within certain limitations, the lighter this type of equipment can be made per unit of capacity, the more economical and efficient it should prove in operation. Next in order is a change in the type of passenger trains operating in day service between large cities. Here again, because these trains will be operated as separate units, the designing engineer will enjoy a wide latitude, unhampered by other than economic and operating conditions—unhampered, that is, in case engineering judgment is not over-ruled by the desires of management to realize more from equipment than might best serve the requirements of competition; such as, to expect a rail car to be so designed as to compete in all respects with the comfort, speed and low operating cost of the bus and passenger automobile and in addition perform the functions of a locomotive. It seems unreasonable to suppose that, possessed of a private right-of-way running from center to center of every sizable city, our railroads cannot provide such superior service, from the standpoint of speed, comfort, cost and safety as to restore, in a substantial measure, the character of business they have lost or are losing, temporarily, to the buses, private cars and airplanes.

It is also probable that container cars, such as the railroads have not utilized to the fullest extent heretofore, and other light weight freight equipment will provide fast, frequent freight service over these same private highways as an effective means of meeting the new competition confronting them by the rapidly expanding use of automobile trucks.

These are indications of the radical changes imminent in the design of certain classes of freight and passenger equipment which might be termed the revolutionary extremes brought about by new competition. There are other important changes which will take place more slowly and which I submit cannot be regarded as revolutionary.

Approximately 80 per cent of the freight which moves over the rails of the United States is not in serious jeopardy from any competition which has yet appeared in the transportation field. It is significant that loadings in hopper and gondola cars have not decreased since 1928 by any greater percentage than the decrease in the production of the commodities carried in that class of equipment. In the case of bituminous coal, for example, the ratio of the tonnage carried by rail to the total produced is the same as it was 10 years ago. This holds true, moreover, of other heavy commodities, oil being a notable exception, and hence, existing types of high capacity hopper and gondola cars, being the most economical means of transporting these commodities, are not obsolete and subject to extreme change to make them acceptable from the standpoint of competition.

Better Steels Will Contribute to Lighter Weight

Much can be said, however, in favor of the modernization of this equipment. In fact, as various factors of expense, time, and gradual change will permit, a helpful and substantial reduction in the dead load hauled is bound to be made through new design and use of better grades of steel affording adequate resistance to corrosion. This will permit the ultimate strength of the steels

to be utilized with resulting reduction of area and consequent reduction of weight in the car structure.

The transition from wood to steel in railroad equipment considered only added strength and capacity and did not lay emphasis upon the important combination of strength, capacity and light weight. The result was heavy and strong equipment built of ordinary grades of steel, quite adequate to the purpose at the time because it marked a real advance in car construction, but in terms of the grades of steel available today, all equipment carries an unnecessary burden of dead weight. In other words, the past design of car equipment could be represented by the structural steel beam of regular open hearth steel with its generous cross section providing stiffness and giving proper protection against corrosion, but in few instances being used to its full ultimate strength. To continue the simile, the future designs of vehicles used in rail transportation might be represented, in varying degrees, by a strip of high tensile alloy steel selected from the non-corrosive or rust-resistant group and which, because of its extreme strength, could be formed into a box-like section, drawn into a molding or tube, or corrugated to provide the required stiffness.

The ingenuity of the engineering fraternity aroused to both the demands and opportunities of the situation may be relied upon to evolve the new designs and perfect the art of fabricating the steel shapes together by welding or riveting or by a combination of both.

We can now refer again to the close relationship which exists between the new competition of the railroads and the degree of change necessary in car equipment to cope with the situation successfully. At one extreme where the branch line business has just about disappeared equipment, new in every detail, is probably needed to restore it. This is the radical and revolutionary left. The relationship persists throughout all degrees of competition and classes of equipment to the heavy duty, open-top equipment on the extreme right, where both competition and hence the need for change in equipment is the least impressive and where a conservative and sane evolution rather than an extreme revolution is in progress.

It is a significant fact that the adaptability of various new alloy steels in the scheme of new designs induced by competition today bears a general relationship to the degree of requirement. Where the competition is keenest and the most radical departure in design is required, the most radical of the new alloy steels come into play; that is, on a basis of the cost, the strength and the resistance to corrosion.

Where the competition is less compelling and design of equipment does not need to undergo such drastic change, steel requirements will be satisfied by the more conservative and less costly grades with a lower factor of rust resistance—and so on progressively down the line until we reach the large group of equipment which suffers little active competition. In this group there seems little need to modify designs fundamentally but improvement is imperative, with reduction in the ratio of weight to capacity the main object, and steel requirements under such conditions will remain relatively unchanged.

The subsidiary companies of the United States Steel Corporation are now introducing a range of steels which it is confidently believed will make a substantial contribution to progress in the railroad industry. The grade which has attracted the most attention recently is the stainless steel referred to as USS 18-8. It stands at the top of the list, on a cost per pound basis, but because of its remarkable properties, both physical and corrosion-resistant, it may well be that it will prove the cheapest material available for some of the radical light-

weight designs we have mentioned as revolutionary in character.

Next in line is a new range of lower alloy steels, at lower costs and gradually less corrosion resistance, from which a proper selection can be made according to the demands of life, strength and necessity for weight reduction in various types of equipment to secure further economies in operation. Mention will be made of only two of these steels. First, a low chromium steel of perhaps more than four times the resistance to corrosion and one and one-half to two times the strength of regular open-hearth grades. This grade should give an extremely good account of itself. Another steel referred to as "medium manganese" promises to find a wide market in the modernization of rolling stock. This steel with copper content affords about the same resistance to corrosion as copper-bearing open-hearth steel and has approximately double the strength. Its other properties are excellent from a machining and fabricating standpoint. A substantial weight reduction should result in applying these grades of steel to the latest designs of open-top and box car equipment.

Meeting the Challenge of New Conditions

In conclusion, I should like to summarize the main points which I have tried to emphasize. First, there are some radical changes taking place in both passenger and freight transportation. Second, new and radically different types of equipment are necessary if the railroads are to recover and retain certain classes of business in these two fields. Third, the view entertained by some of the prophets in the railroad industry, that all railroad equipment is obsolete and immediately subject to radical change, is not supported by the facts. And finally, the rolled steel industry, which has played such a prominent part in the railroad field, has awakened to the problem which this new challenge to the railroads constitutes and is determined to meet the demands which the situation imposes upon it.

I believe we are at the beginning of a new era in the application of steel to all types of construction. In some fields, activities have been dominated almost wholly by the various grades of open-hearth steel. The era that is now opening, while it will continue for a long time to base its chief activities upon open-hearth grades, will nevertheless be influenced more and more and in various directions by the new alloy steels of high strength and rust-resistant quality. Not only in the field of railroad equipment, but in other fields too numerous to mention, this effect is bound to be apparent.

The possibilities are well nigh incalculable. I do not want to indulge in imaginative forecasts or exaggerate the importance of a movement that admittedly is still in its infancy. But, as a general proposition, whenever new materials have been put into the hands of man, he has used them freely and created new requirements for their utilization. Thus new materials actually make their own era.

The problem of the future of steel is one which must profoundly interest the scientist and the professional man and challenge their keenest creative faculties. Metallurgists have discovered new and remarkable materials; the steel industry is adopting them and placing them in commercial production. Other new alloy steels will undoubtedly be discovered. Processes will be discovered whereby present costs of production can be lowered.

The producer and the fabricator of these new materials will have an interesting and important function to perform. As the demand increases and the possi-

bilities of the market develop more widely, his returns will be a legitimate participation in the physical advancement of society. But in a very real sense, the chief satisfaction will go to the scientist and the professional man—to the engineer, the architect, the metallurgist, the inventor, the designer. These are the ones to whom the opportunity is given to evolve the new materials and apply them to purposes of use and beauty; to incorporate them in a new world.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended November 25 amounted to 581,347 cars, a reduction of 17,942 cars as compared with the week before and an increase of 88,029 cars as compared with the corresponding week of last year, which, however, included the Thanksgiving Day holiday. For the same reason there was an increase of 22,549 cars as compared with 1931. All commodity classifications showed decreases as compared with the week before and all showed increases as compared with last year. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading			
Week ended Saturday, November 25, 1933			
Districts	1933	1932	1931
Eastern	132,525	109,177	120,175
Allegheny	113,058	89,908	111,114
Pocahontas	38,701	36,965	33,757
Southern	83,705	74,905	85,898
Northwestern	67,432	56,775	65,152
Central Western	94,576	78,864	92,818
Southwestern	51,350	46,724	49,884
Total Western Districts.....	213,358	182,363	207,854
Total All Roads	581,347	493,318	558,798
Commodities			
Grain and Grain Products.....	31,998	26,663	29,592
Live Stock	17,584	17,102	23,563
Coal	127,426	115,047	104,451
Coke	6,536	4,945	4,741
Forest Products	22,855	14,757	19,835
Ore	4,505	1,727	4,190
Mdse. L. C. L.	164,649	146,751	177,033
Miscellaneous	205,794	166,326	195,393
November 25	581,347	493,318	558,798
November 18	599,289	572,623	653,503
November 11	577,676	536,687	689,960
November 4	607,785	587,302	717,048
October 28	636,674	617,284	740,363
Cumulative total, 45 weeks.....	26,395,461	25,696,670	34,376,466

Class I railroads on November 14 had 418,476 surplus freight cars, an increase of 33,339 cars compared with October 31. The total included 129,975 coal cars, 241,609 box cars, 19,488 stock cars, and 9,350 refrigerator cars.

Car Loading in Canada

Car loadings in Canada for the week ended November 25 totaled 44,492 cars. This was a decrease from the previous week of 2,928 but was an increase of 1,218 cars over the corresponding week in 1932.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
November 25, 1933.....	44,492	19,735
November 18, 1933.....	47,420	18,754
November 11, 1933.....	47,442	17,955
November 26, 1932.....	43,274	17,250
Cumulative Totals for Canada:		
November 25, 1933.....	1,846,357	868,099
November 26, 1932.....	2,002,026	888,123
November 21, 1931.....	2,353,706	1,179,472

An Economic Survey of Motor Transportation

WASHINGTON, D. C.

THE Bureau of Railway Economics after months of study has just completed and made public an "Economic Survey of Motor Vehicle Transportation in the United States."

"Railway freight traffic," said the Bulletin issued by the Bureau, "has increased during the past thirty years, but at a gradually declining rate of increase. Passenger traffic by rail has steadily decreased since the war. Interurban electric railway traffic is on the decline, both as to freight and passenger. Inland waterway transport, on the other hand, is undergoing a renaissance, under the fostering care of the government which supplies a free system of waterways at the cost of the general taxpayers. Pipe line mileage and traffic are growing. Motor vehicle and air traffic have exhibited a rapid and, for the most part, an accelerating rate of growth during the past ten years. These developments have brought a new phase into the economics of transportation in the United States, making it necessary to reconsider our whole transportation policy in the light of new conditions."

Motor Truck the Most Important Competitor

"The motor truck is the most important competitive commercial agency which the railroad industry confronts at the present time, although competition of the motor bus is not to be disregarded."

"Very large sums have been lost by the railways through the diversion of freight traffic to the motor truck and passenger traffic to the private passenger car and motor bus. While the railways derive considerable traffic and revenues from the automotive industry, such revenues are now a comparatively small proportion of the amount annually lost to the motor vehicle as a competitive agency of transport."

"The unequal regulation of railway and highway transportation, together with the competition between motor transport agencies themselves has led to a considerable degree of market demoralization."

It is pointed out that the Interstate Commerce Commission has referred to the "unrestrained and destructive competition between motor carriers, between water carriers, and of both with rail carriers," as having not only "an unduly depressing effect upon the revenues of the rail carriers," but also "a disorganizing influence on business in general and tending to prevent the maintenance of a stable and nondiscriminatory rate adjustment by the rail carriers." These conditions, in the opinion of the commission, will continue to exist, "so long as interstate motor and water carriers are exempt from requirements that their rates be published and maintained on a reasonable stable and nondiscriminatory basis."

"With the development of the heavier motor truck and motor bus for commercial purposes, it has been necessary to build wider, thicker, and costlier highways, to withstand the physical strain of carrying the heavier loads imposed on them. While engineering details are not available to supply an exact formula by which to ascertain such additional costs, they add considerably to modern street and highway costs. The problem is to determine whether commercial motor vehicles meet the additional highway costs they create."

"A formula is outlined in this survey, to indicate a

method of approach to this question. In relation to highway costs, the formula shows that the surfacing and grading costs of a highway adequate for the largest and heaviest group of motor vehicles (5-ton trucks and over, and passenger buses, of over 33 seats) would be more than twice as great (210.4 per cent) as the cost of a highway ample for the base group of vehicles, here taken as including all passenger cars and all motor trucks of less than 1½ tons capacity."

"Application of the formula to available data for the United States as a whole indicates that the base group of vehicles, 91 per cent of the total number of motor vehicles of all classes, would pay 45 per cent of the total road budget, while the remaining 9 per cent of the vehicles would pay 55 per cent of the budget. The formula further develops that a 5-ton truck, or buses of over 33-seats, should properly contribute 107 times as much to the highway budget as the average vehicle in the base group."

Motor Vehicle Taxation

Regarding motor vehicle taxation the bulletin said:

"In considering taxation of the motor vehicle, distinction should be made between taxes and fees levied on motor vehicle owners as highway users, taxes and fees levied on commercial motor vehicle operators as users of streets and highways for business purposes, and taxes intended for the general purposes of government which are levied against the motor vehicle. Motor vehicle registration and license fees collected in the United States in 1931 amounted to \$344,000,000. Total gasoline tax receipts in the same year amounted to \$536,000,000. State gasoline taxes are levied in every state and the District of Columbia, ranging from a minimum of two cents per gallon to a maximum of seven cents per gallon."

"In comparing motor vehicle taxation with railway taxation, certain contrasts between the two should be kept in mind. It is frequently asserted that motor vehicles pay relatively higher or lower taxes than railways. The fact is that the total taxes paid by these industries cannot be directly compared one with the other. The important question with respect to any transportation agency is whether it in fact pays its own way, and whether in addition it pays its proper share of taxes for the support of government."

"The railways clearly pay their way. They own their roadway and maintain it. In addition, they pay heavy taxes, which help to meet the general cost of government, such as for schools, police, and administration. They also contribute substantial sums toward the cost of constructing and maintaining streets and highways."

"Commercial motor vehicles pay property and income taxes. Their right-of-way—the highways—is supplied by the public, and they pay certain special taxes intended to contribute toward their share of the cost of highway construction and maintenance."

"Total funds made available for all highway purposes," the bulletin continued, "1923 to 1931, a nine-year period, aggregated \$13,060,000,000, of which only 36.2 per cent was contributed by highway users in the form of fees and gasoline taxes. The corresponding total for 1931 alone was \$1,836,000,000, of which 43.6 per cent was contributed by highway users. Throughout this study, "highway users" are credited with some payments of gasoline taxes that are contributed by non-users of highways, such as railways, motorboats, aircraft, stationary engines, etc."

"Total disbursements for highway purposes during
(Continued on page 823)

Deferred Maintenance — What of It?*

Liberal expenditures during the twenties made
curtailment possible during the thirties—
A lesson for the future

By Elmer T. Howson

Vice-President and Western Editor, Railway Age

TO state that the last four years have been ones of unusual difficulty and trial, brought about by the necessity for the curtailment of expenditures, both personal and corporate, is but to state that which is common knowledge. Yet it is entirely possible that too many of those who are vitally concerned with its implications have not had the opportunity or have not taken the time to stand aside and survey the magnitude and the character of this retrenchment and its effects in the way that gives one a proper perspective. It is for this reason that any study of what has happened in the maintenance of way and structures should include a study of this retrenchment in its broader aspects.

The term, maintenance, signifies the making good of the deterioration brought about by the elements and by use. Every train that passes over a track exacts a toll of service life, possibly small but nevertheless actual, that must be restored sooner or later. Numerous studies have shown that the service life of a certain section of rail, under a given set of conditions can be forecasted with reasonable accuracy, the prime influence being the volume of traffic carried. Likewise with ties, where decay is a major, if not a con-rolling, factor, life is measured in years, largely independent of fluctuations in traffic. So it is with the life of other units of roadway and structures, some limited largely by use, others principally by the elements, and most of them by a combination of the two agencies. It is this deterioration that gives rise to the necessity for maintenance. If this necessity is not met, there is deferred maintenance.

Is There Deferred Maintenance Today?

Is there deferred maintenance today? To one familiar with the conditions that have prevailed during the last four years, there would appear to be only one answer. Yet there are those, and some in positions of high authority, who contend that there is relatively little deferred maintenance today. In support of their position, they point to the riding condition of their tracks, a condition that approximates, if it does not actually equal, that of the boom years 1928-1929. In a recent inspection trip over some 300 miles of main line on a prominent eastern railway, at speeds up to 85 miles per hour, the track rode with the same smoothness that had been noted on a similar trip some four years ago. That track has carried millions of tons of traffic in this interval, while in this period the amounts spent for maintenance have been reduced to levels that would have been thought impossible only a few years ago. Is there under-maintenance where track rides as well as this track does?

Let us answer this question by approaching the problem from a somewhat broader basis. In the five years 1925-1929, inclusive, the Class I railways of the United States spent an average of \$849,562,780 annually for



The Effects of Deficiencies in Maintenance Expenditures Soon Become Apparent in Tracks of Light Construction

maintenance of way. In 1930 they spent \$705,000,000; in 1931, \$531,000,000; in 1932, \$351,000,000; and this year they will spend approximately \$330,000,000. If the expenditures for the last four years be averaged, they approximate \$479,000,000 annually, a decrease of \$370,000,000, or 44 per cent per year, while the expenditures for the present year are more than 60 per cent below the 1925-1929 level. Measured from this five-year average, the accumulated decline for the last four years reaches the staggering total of \$1,450,000,000, an amount equivalent to one and three-quarter year's maintenance expenditures on the 1925-1929 basis.

But it may be pointed out that the last four years have been a period of declining traffic and that the wear and tear produced by traffic has been reduced. This is true, and to the extent that maintenance is influenced by traffic, due allowance should be made in arriving at the amount of deferred maintenance.

Greater Results Per Dollar Spent

The past four years have also been years of almost unparalleled efficiency in labor. With a tremendous surplus of labor and with men seeking employment on every hand, those who are employed in maintenance work have realized the necessity of doing their utmost in order to hold their jobs. There has been, therefore, a greater return of productive work per dollar expended in wages than in the period prior to the depression. There has also been a considerable decline in costs of materials, with the result that the railways have secured a greater value from their expenditures for materials as well as for labor, than heretofore. Obviously these economies must also be taken into consideration in determining the amount of the deferred maintenance and allowance made therefor. The proper allowance to make for these somewhat intangible but nevertheless very real economies is difficult to determine. It must necessarily be an estimate. The best estimates are, however, vastly better than no figures at all. Making due allowance for the fact that the deductions are estimates, it is believed that the total accumulation of deferred maintenance now approximates \$700,000,000.

If more specific figures are desired, one may consider

*Abstracted from a talk before the Maintenance of Way Club of Chicago.

such items as rail renewals. In the years 1925-1929, inclusive, an average of two million tons were relaid annually. In 1930, the total declined to 1,517,000 tons, in 1931 it was 984,000 tons and in 1932, 334,000 tons, while the amount laid this year will probably not greatly exceed 250,000 tons. In other words, in the last four years the tonnage laid has averaged only 771,250 tons, or 38 per cent of the 1925-1929 average, while this year the tonnage laid is only 12 per cent of the five-year average. Again, making allowance for the reduced wear and tear and also for the increased rehabilitation of rail through welding battered ends, the more extensive use of curve oilers, etc., it is estimated that there is today a total accumulated deficiency in rail renewals approximately 3,400,000 tons. According to a similar analysis, it is estimated that there are today in track more than 75,000,000 ties which would have been renewed under more normal conditions.

In the face of figures like these, it would seem a waste of time to go further to demonstrate the presence of deferred maintenance. Yet the excellence of the riding condition of the tracks referred to and many others like them, demands a reconciliation between two apparently conflicting positions. Let us, therefore, look back over the years immediately preceding the crash of 1929. In those years, railway traffic ran at peak levels—earnings were correspondingly large—and the roads plowed these earnings back into their properties more liberally than ever before. Heavier rail was laid; the use of treated ties became almost universal; more and better ballast was added; drainage was improved.

A Reserve of Service Strength

These and other improvements are all immensely worth while, and of a nature to contribute materially to reductions in maintenance expenditures. As a result of such programs, the tracks were in a higher state of maintenance in 1929 than ever before in railway history, and possessed a vast reserve of service strength that was just as real as if the money so expended had been placed in a bank to draw on in a period of reduced earnings—and vastly safer and more accessible when needed. It is on this reserve strength or "fat" that the railways have been drawing to make good their deficiencies in maintenance expenditures during these lean years. That there is, however, a limit to this surplus strength—and a very definite one—requires no demonstration. That it is being reached on not a few roads would appear from the deterioration in riding condition that has become evident in not a few quarters in recent weeks.

But we are all too commonly inclined to measure maintenance of way conditions solely by the riding quality of the track. How about the structures? Is the painting of buildings or of bridges of proved economy? We know that it is. We know also that almost no paint has been applied in recent years. Are we giving the attention to water-way openings that we did a few years ago or that we believe to be in keeping with proper standards of maintenance? Are we giving the same care to a hundred other tasks that were formerly considered essentials of good maintenance? We all know that we are not. We also know that with most of these operations there will be a day of reckoning. If we need to refresh our memories, we might well reread the arguments and evidence presented by the representatives of the railways back in 1920-22 when they were setting up their claims of the inescapable effects of undermaintenance as practised by the United States government when it ran the railways during the period of federal control.

In considering the problem of deferred maintenance, one should recognize also that in the period from 1923-

1929, we entered a new era in maintenance of way objectives in which the properties were so improved that safety no longer became the primary consideration but gave way to that of ultimate economy. Prior to a decade ago, maintenance officers were constantly struggling to keep their tracks and structures abreast with the demands of traffic. Heavier locomotives and trains demanded stronger track, longer turntables, heavier bridges, larger enginehouses, etc. Improvements in track structure were utilized immediately by the mechanical department as an opportunity for the operation of heavier locomotives, continuing an apparently never-ending cycle.

About 1923, however, locomotive builders encountered other obstacles to the development of locomotives, such as clearance limitations, which curbed their further increases in size. In the meantime, maintenance officers continued to improve their properties and to strengthen them until safety became a secondary consideration, while economy took the primary position. In other words, the question came to be that of whether a further improvement would pay. This was the quest that led the Kansas City Southern to undertake its elaborate investigation to ascertain what was the most economical rail for its traffic and operating conditions, a study that led to the conclusion that a 137-lb. section was the cheapest, all costs considered, whereas 85-lb. rail was the standard then in use—a section adequate from all considerations of safety. It is this objective which has led the roads so generally to build up their properties, notably through the use of heavier rail, but equally so in other channels as well. As this basis for procedure is more generally recognized, we will see vastly increased expenditures for materials and equally pronounced decreases in the outlay for repair and replacement.

A Sound Policy for the Future

As we emerge from the depression, and I believe that we are now doing so, we will recognize certain lessons. One of these is the great desirability of plowing a reserve strength into our tracks and structures, as earnings permit, in order that we may be able to weather the periods of reduced earnings that come at more or less regular intervals. Such expenditures are not an extravagance, but rather the act of prudence in laying up a reserve for a rainy day.

Another lesson that we have learned is that we must so re-orient our methods of working as to avoid the constant tearing up of our tracks to renew a tie here, to relay a little rail there, or to disturb our track in other ways. To no small degree, the relative excellence of our tracks, in the face of the neglect of the last four years, has been due to the lessened disturbance experienced. Some few roads have so organized their work as to overhaul a portion of each section more or less thoroughly every year, and to leave that portion of the section undisturbed so far as possible for two or three years thereafter. With treated ties that now last 20 to 25 years and with rail life extended to similar figures by heat treating, by welding, by the use of curve oilers, etc., it is not beside the point for us to study the merits of the practice now widely employed in Europe of renewing track out of face in panels previously assembled, at intervals equal to the life of the rail and ties.

It is through such measures as these that I believe that the maintenance of way man, and especially the track man, will face the necessities of tomorrow. Railway transportation is on trial today as never before in its history. Competitors are taking traffic from it on all sides. It must meet this competition with a service more fully adapted to the needs of the traveling and shipping

public and, equally important, priced in keeping with that of its competitors. This not only requires tracks that will stand up under the speeds at which freight and passenger trains alike are now traveling, but the even greater speeds that may be realized, if the 110 mile an hour trains which the Union Pacific and the Burlington are now building become the forerunner of a new type of rail passenger train transportation.

Must Participate in Cost Reductions

Equally important is the contribution which the maintenance department must make to the reduction of transportation costs through the drastic lowering of the cost

of doing its work, for our railways can reduce the prices at which they sell their service to the public and thereby meet the competition of the bus and truck, only to the extent that the maintenance of way and other departments reduce the costs of their various activities. The apparently conflicting requirements of a better track at a lower cost are before us. Splendid as the record of the past has been, it is imperative that the roadway department continue and intensify its search for ways to reduce its costs still further. The years through which we have passed, and especially the last ten, have been years of outstanding achievement. Years immediately ahead offer opportunities for even greater progress.

Prospects Good for P.W.A. Loans

Substantial business in equipment and railway materials
foreseen as negotiations progress

WASHINGTON, D. C.

PROSPECTS for a very substantial amount of business and re-employment to result from maintenance work and purchases of rails, fastenings and new equipment financed by loans from the Public Works Administration are seen as continued progress is made in the negotiations between the railroads and the P.W.A. officials regarding the detail conditions to be included in the loan contracts. These involve not only discussions as to the security to be required from roads of varying credit status and as to the varying classes of loans, but also consideration of the conditions under which labor is to be employed on the various contracts to comply with the labor provisions of the national recovery act. For this reason the conferences with the P.W.A. and its legal department have been participated in by representatives of the equipment and supply manufacturers and of the labor organizations.

Many Applications Have Been Made

While the P.W.A. has declined to make public the names of individual roads with which negotiations have been conducted until they result in definite allotments, it is known that a large number of roads have made applications and inquiries which are in various stages of progress, and it is understood that there are many either preliminary or formal applications as to which the complications that have arisen as to some companies, particularly railroads in the hands of trustees or receivers, have not occurred. The P.W.A. has not laid down a general plan to govern all loans, although it has announced general conditions as to various classes of loans and it had already adopted a general policy interpreting the labor conditions of the recovery act which apply to all P.W.A. loans.

The provision in the law that "so far as practicable and feasible" no individual directly employed on projects financed with P.W.A. loans shall be permitted to work more than 30 hours a week has been interpreted to mean that the labor provisions of N.R.A. codes for the various industries concerned shall govern. The railroads are not under the N.R.A. and have no code, so it has been decided, after conferences with labor, that wages which have been established under the terms of the railway labor act shall apply to work done by railroads with their own forces. As to many of the equipment and supply manufacturers and sub-contractors, however, spe-

cific codes have not yet been adopted but are in various stages of progress through the N.R.A. and in such cases the conditions of the President's Re-Employment Agreement, or the 30-hour provision in the law, are to govern. The P.R.A. provides for a 35-hour week for labor, with minimum wages of \$12 to \$15 a week, while the regular P.W.A. minimum labor rate, for application with a 30-hour week, is 50 cents an hour in the North, 40 cents in the South, and 45 cents in intermediate territory. The code requirements would apply to any work, whether financed by government loans or not.

It has been officially stated that the application of these labor conditions to the numerous contracts involved in the Pennsylvania's electrification project has been one of the principal time-consuming elements in the negotiation of its contract for the \$84,000,000 loan which was generally approved by the Special Board for Public Works on November 2.

For all loans the Administration has offered an interest rate of 4 per cent, with no interest for the first year. For the purchase of rails and fastenings it has offered ten-year loans but has recently suggested a plan by which the loans would be amortized in eight annual payments, beginning with the third year. In some cases it has asked collateral security but in many it is willing to accept unsecured promissory notes.

For new equipment the government will buy equipment trust notes month by month in amounts that may be necessary to meet the purchases. These notes are to run 15 years on freight equipment and 20 years on locomotives and passenger cars.

For equipment repairs collateral will be required and in its general circular on railroad loans the P.W.A. has asked applicants to discuss their proposed plans for financing. For structural work loans may run for as long as 30 years.

Several roads have placed orders for rails without asking for government loans. Co-ordinator Eastman's letter to the steel companies regarding the rail orders stated that in the case of 452,785 tons, and perhaps 502,785 tons, of the total of 844,525 tons of tentative commitments, orders were contingent upon loans from the P.W.A. but that some roads intended to do their own financing. While he had asked the roads to submit to him the prices quoted them for rail fastenings, which are the prices filed by the companies with the American

Iron & Steel Institute, it is understood that he has raised no objection to the prices and that some roads are already placing their own orders.

Voluminous Information Required

A nine-page printed circular outlining the information required to be furnished with applications for aid in the financing of railroad maintenance and equipment, grade crossing eliminations, and other projects under the national industrial recovery act has been issued by the Public Works Administration as Circular No. 5. No special form of application is required but four copies of each should be filed with the P. W. A., and the information asked regarding the purposes of the loan, the company's financial condition and the security to be offered is most voluminous, although many railroads have already assembled a large part of it with their applications to the Reconstruction Finance Corporation and the Interstate Commerce Commission for loans in the past two years.

Railroad maintenance and equipment, for which financial aid may be extended, must have the approval of the Interstate Commerce Commission "as desirable for the improvement of transportation facilities," under section 203 of the recovery act. If the project is one which requires a certificate of public convenience and necessity or other authorization by the commission, under the interstate commerce act, such certificate or authorization must be obtained prior to the granting of any loan by the Administration, but such certificate or authorization is not required prior to the making of an application for a loan. The form and terms of the obligations to be given and the security therefor must comply with the requirements of the Administration, and with the requirements of the commission under section 20(a) of its act.

Highway crossing eliminations and other projects financed partly by the state or by local authorities should be submitted through the state advisory boards of the P. W. A.

Regulations of the I. C. C. governing applications to it are contained in an order of the commission dated October 25.

The maturity of the obligations may not exceed 30 years or the conservatively estimated life of the project or equipment, whichever is less. Documents evidencing the applicant's obligations for the loan and indentures and other instruments securing the same should not be executed on behalf of the applicant until they shall have been approved by counsel for the Administration.

Some of Requirements Listed

The information called for is listed under 17 numbered heads and in schedules numbered from A to R. Some of the requirements are as follows:

State whether applicant will secure the necessary funds in part from any other source and, if so, the source and amount thereof, and the terms upon which part will be obtained.

Statement that no agreement has been or will be made by the applicant to pay any person, association, firm, or corporation, either directly or indirectly, any commission or fee for the loan applied for, and that no such payments have been or will be made by the applicant.

The purpose of the loan and uses to which it will be applied, and the date or dates on which the funds must be available to the applicant. If all or a part of the project, maintenance, or equipment is for a line not wholly owned by the applicant, its interest in such line should be fully described.

A description of the work should be given, showing the work to be done and/or the equipment to be acquired, built, or repaired, with the estimated cost of labor, materials, and other items of expense which will be required to complete the same. Such estimates should be set up in accordance with the classification of

accounts prescribed by the Interstate Commerce Commission. Description should show the types of work to be done and the number of men to be employed in each type of work and the length of their respective employments.

A statement should be given as to all contracts prepared or entered into or to be prepared and entered into in relation to the work to be financed, the parties to such contracts, and the terms thereof, together with a statement of the work necessary to complete all contracts made prior to the filing of the application and the estimated cost of labor and materials which will be required to complete all such prior contracts.

If the project has been ordered or approved by any public authority (e.g., by order of the State Public Service Commission), that fact should be stated.

The present status of the applicant's existing financial relations with the United States.

Full particulars should be stated as to terms of payment and amortization which the applicant proposes to make.

The latest valuation placed by the Interstate Commerce Commission upon applicant's property, separately stated for owned carrier and noncarrier property, and date as of which valuation was determined, together with the aggregate net property changes to the latest date to which such changes have been reported to the Bureau of Valuation of the Interstate Commerce Commission.

State whether any subsidiary or affiliated organization of the applicant, or any organization of which the applicant is a subsidiary, has applied for or received loans from the Reconstruction Finance Corporation or the Administration. If so, full particulars should be given.

General description of the function of the applicant as a transportation agency in the territory which it serves, a general description of the agricultural, industrial, and commercial districts which it enters and a statement of principal commodities carried, and statement of 10 most important industries served.

Statement in detail as to the particular facts upon which applicant relies as to its present and prospective ability to repay the loan and to discharge its obligations in regard thereto.

Detailed description of the security to be offered for the loan. The applicant must furnish full information, together with copies of documents, and data appropriate to the security offered. The applicant should state its opinion of the value of any collateral offered and the basis for that opinion.

Comparative income account for each year during the 10 calendar years next preceding the year in which the application is made, and for each month of the year in which the application is made, so far as available, together with an estimate of such income, showing the basis therefor, for the 12 months next succeeding the date of the application.

The total dividends declared and the total dividends paid for each of the years indicated.

Comparative statement of expenditures for maintenance of (1) way and structures and (2) equipment for the 10 calendar years next preceding the date of the application and for all preceding months in the year in which the application is made together with estimates for the 12 months' period next succeeding the date of the application, and the basis of such estimates.

For the years indicated in (a) above, details of dividends received, income from funded securities, income from unfunded securities and accounts, and miscellaneous income (account 519).

Comparative statement for the four calendar years next preceding the date of the application, of the amount charged to operating expenses under depreciation accounts, separately for way and structures and equipment, and the estimated amount of such charges for the year in which the application is made, and for each of the two (2) calendar years thereafter. State whether applicant has received or applied for authority to charge amortization depreciation and, if so, the basis and reasons for such accounting.

A copy of complete engineering estimates of costs of labor, materials, and time required for the completion of the project, work and/or equipment should be furnished together with a copy of contracts, maps, and other data essential to a complete and detailed description of the project and the labor and materials involved therein.

Applicant should furnish a carefully prepared monthly forecast for the twelve (12) months immediately following the closing of the loan, showing the cash balance at the beginning of each month and the cash receipts and disbursements, stating controlling factors used in making estimates.

NOTE.—In connection with all comparative statements supporting the application, substantial fluctuations should be explained.

If the project has been ordered or approved by any public authority, a copy of the order, together with a copy of any reports or opinions accompanying such order, should be furnished.

The validity and lien of each item of collateral offered.

If the loan applied for is for the purpose of financing the

acquisition of equipment, the plan for financing the same should be fully discussed in all its legal aspects, whether involving a conditional sale, an equipment trust agreement, or other method of financing; also the validity thereof under state law, as affected by state statutes relating to filing and recording of instruments to be executed in connection with such financing.

Special legal considerations relating to the project or acquisition of equipment, and the plan for financing the same.

The needs of industry for credit and refinancing are illustrated by the condition of our railroads, said Harry H. Woodring, Assistant Secretary of War, in an address at Birmingham, Ala., on December 5. "This industry needs new locomotives, new cars, and new rails. It is estimated by the *Railway Age* that deferred maintenance requirements for this class of equipment has risen to a sum of about one billion, two hundred million, and that there has been a total reduction of almost five billions of dollars in railway capital and maintenance expenditures as a result of the depression. The earning power of our transportation systems is also definitely restricted by the lack of traffic in raw materials and coal which results from inactivity in our heavy industries.

"Like other industries which are consumers of capital goods, the railroads must look to private capital and to the investing public for funds with which to rehabilitate themselves. If this capital were forthcoming these industries could buy now and this would enable the builders of industrial equipment to put men to work and to spend millions of dollars for raw and semi-finished materials of all kinds. It is estimated that nearly one-half of our total unemployed are found among those who were formerly engaged in the manufacture of durable goods as distinguished from consumers goods. This unemployment among people in the heavy industries is one of the major factors which must be combated in our battle on depression.

"But private capital is not making itself available for this purpose, and until it does the government will be faced with the necessity of continuing the expenditure of huge amounts for public and civil works and other relief projects in order to provide employment for our people.

"To pay for this will require the imposition of higher and higher taxes with a growing tendency to extract the great bulk of them from those who have accumulations of wealth and those whose incomes are in the higher brackets. In other words, if private capital cannot be induced to perform its proper function in a normal manner, the government will be forced by an aroused and a determined public sentiment to carry the burden and finance itself from those who are still able to pay."

* * *



On the High-Speed, Well-Maintained Track of the Erie's Susquehanna Division

An Economic Survey of Motor Transportation

(Continued from page 818)

the same nine years, including payments on principal of bonds and other obligations, aggregated \$13,037,000,000. Corresponding disbursements for the year 1931 alone amounted to \$1,857,000,000. These statistics do not cover city streets, which form an important part of the street and highway network of the nation. A comprehensive survey of motor vehicle transportation must include consideration of city streets and their costs.

"Revenues devoted to the improvement and maintenance of city streets are secured largely from property taxes. Comparatively little is derived by cities and municipalities, directly or indirectly, from state motor vehicle fees and gasoline taxes, or from municipal motor vehicle licenses. It is estimated that the expenditures on all city streets in the nine-year period from 1923 to 1931 aggregated \$6,753,000,000, of which only 4.7 per cent was contributed by motor vehicle operators. The corresponding expenditure for 1931 was \$743,000,000, of which 7.7 per cent was contributed by motor vehicle operators.

"The total of funds made available for highways, and expenditures for city streets, in the nine years 1923 to 1931, amounted to \$19,813,000,000, of which only 25.4 per cent was contributed by highway users. Corresponding statistics for highways and streets in 1931 were \$2,579,000,000, the highway users' contribution to which was 33.3 per cent. Outstanding state, county and city bonds for street and highway improvement at the end of 1931 totaled \$4,728,000,000, with an annual interest charge averaging 4.65 per cent.

"City streets are a vital part of the road network of the United States. Motor vehicle operators in the cities pay at least the same rate of state license fees and gasoline taxes as those in rural districts. A substantial proportion of these fees and taxes are contributed by motor vehicles operating in cities, many of which rarely use the rural highways outside city limits. Despite these facts, a relatively small proportion of the receipts from those fees and taxes are allocated by the states to the cities. Increasing demand for a larger share of those receipts is being made by cities and towns throughout the country.

State Regulation of Motor Vehicles

"States now regulate motor vehicles through license laws, imposition of fees and taxes, safety regulations, traffic rules and regulations. As to commercial vehicles, many states also have restrictions in force as to maximum permissible width, height, and length of a single unit, or two or more units in combination. Weight limitations, per wheel or per axle, are also in effect. The tendency is toward greater restriction of dimensional and weight limits. A majority of the states have regulations governing the hours of service of motor truck and bus drivers. These are far from uniform, and have proven difficult to enforce, in the absence of any Federal supervision over truck and bus movement from state to state.

"Some degree of supervision over hours of service of employees of motor bus and truck operators is contemplated by the approved or proposed NRA codes of fair competition for these agencies.

"As to *intrastate commerce*, most of the states regulate motor carriers of passenger or freight, applying generally to common carriers only. These regulations vary

between states in many details. Some state laws regulating commercial motor vehicle operation have been appealed to the courts. The Supreme Court has ruled that a state cannot constitutionally regulate interstate commerce by motor truck or bus, but can and may apply its own police powers to protect its highways. Several state laws have been tested, notably those enacted by Texas and Kansas, and they were upheld by the Supreme Court.

"As to *interstate commerce*, the steam railways are under a particularly strict form of regulation, progressively developed since 1887. Under the National Industrial Recovery Act of 1933, temporary codes of fair competition have been approved or are under consideration, which are designed to apply certain indirect measures of control to the truck and bus industries, particularly as to hours of service and wage rates. The federal government has not, however, extended its regulatory jurisdiction to motor vehicle operation, although it exercises more or less regulation over every other form of transport activity. There is substantial public opinion that federal regulation of motor carrier truck and bus operations is needed."

In conclusion, the bulletin said:—

"The problem of motor vehicle transportation affects the future economic welfare of the United States. Shall that problem be left unsolved, under conditions of growing and unregulated competition with resultant chaos in the field of transportation? Or shall it be worked out under a scheme of fair and reasonable government regulation of all transport agencies, such as will promote the maximum welfare of the public? This fundamental question as to national, state, and local policies cannot go long unanswered."

Are Smaller Freight Cars Needed?

(Continued from page 814)

5-ton shipments because the manufacturer cannot carry a stock and when he places an order, he must have the material the same day.

It is impossible to forecast what would happen if the railroads entered the trucking business. If they were regulated, they would not be able to compete effectively with unregulated operators. It is logical also to assume that the railroads would pay their employees commensurate with the work performed. The cost to the railroads to perform the service, therefore, would be higher than to the small operator who does the work for what he can get. If the railroads entered the trucking business, large sums of money would have to be invested in truck equipment and facilities. In view of these circumstances, would railroad truck operation be more profitable or prudent than the introduction of the small car?

In conclusion, the value of the small car in regaining traffic lost to the trucks depends upon whether the railroads can and will adjust their present plants to accommodate it. If the small car can not or will not be handled so as to provide speed and frequency of delivery, it will not meet the requirements of shippers. If a small carload rate can and will be established that is less than the l. c. l. rate and not too much higher than the carload rate, the small car will appeal to many shippers now using trucks. In other words, if the railroads can and will reproduce the advantages of the truck in the small car, it would appear to be possible to regain much of the traffic now moving over the highways.

Odds and Ends . . .

Pennsylvania Employees Form New Legion Post

A new American Legion post, composed chiefly of officers and employees of the Pennsylvania's general office at Chicago, was installed in the Chicago Union Station on November 13. It is known as Keystone Post No. 434. John C. Rill, general manager of the Western Region of the Pennsylvania and a charter member of the new post, was master of ceremonies.

Railroad Service

After reading literally dozens of letters and magazine articles to the effect that the railroads are no good, it has been a real pleasure to this department to hear of an incident in which, in an emergency, a railroad went all the way and more in accommodating a passenger. A serious situation faced a man in Tulsa, Okla. His mother, very ill and in a plaster cast, had to be moved without delay from Tulsa to Memphis, Tenn. The man asked for a through baggage car from Tulsa to Memphis in order to provide the transfer at Springfield, Mo., but he was told by the St. Louis-San Francisco passenger agent that it was almost impossible to get a private baggage car. The passenger agent offered a private Pullman car, but this was not satisfactory since the patient's plaster cast was so long that she could not be taken into the car either through a door or through a window. Furthermore, the doctors in charge would not permit her to be moved from one train to another enroute. Shortly, the case was taken up with the headquarters of the Frisco at St. Louis. Almost immediately, word came back that the best steel baggage car that the railroad had would be ready when it was wanted. The car had four side doors so that the hospital bed could be anchored near the center of the car and two side doors kept open for ventilation. In addition, the car was equipped with a cot for the nurse and special ice water was provided. Furthermore, all locomotive engineers and conductors handling the train were instructed to start and stop it carefully and to give the party every attention. All along the line, officers of the railway met the train to make sure that everything was satisfactory and, in addition, a doctor was on hand to look over the patient at Springfield. The journey was completed without mishap. No wonder the Tulsa man now says, "When the railroads want to give service, you can't beat them."

Our Discerning Readers

Apparently very few of our readers were fooled by the catch question published on the "Odds & Ends" page of the *Railway Age* of September 2. The problem, for the benefit of those who have forgotten its phraseology, was as follows: "If the distance from Roswell to Vaughn is 100 miles an hour and an automobile leaves Roswell going north towards Vaughn, running at a rate of speed of 30 miles per hour, and an automobile leaves Vaughn going south towards Roswell, running at a rate of speed of 60 miles per hour, both automobiles leaving at the same time, which automobile will be farther from Vaughn when they pass?"

From the number of answers to this problem which have been received—one of them has come from as far away as Panama, Canal Zone—we are pleased to report that our readers have declined to be fooled. A few have wanted to quibble as to the literal meanings of expressions employed in the problem. For instance, one says, "When the autos pass, they go by each other and that would put the southbound auto which is traveling away from Vaughn south of the auto traveling towards Vaughn." Another says, "Considering the puzzle question as it reads, the answer would be that the automobile traveling 60 miles per hour from Vaughn to Roswell would be farther away from Vaughn going south towards Roswell, running at a rate of or towards Vaughn, would not be from but would be an equal distance to Vaughn."

A clear majority, however, arrived at the correct answer, namely, both vehicles will be the same distance from Vaughn when they pass.

If it is any comfort to those who failed to reach the correct answer to the problem, we might mention that one of those who got a grade of zero on it was a member of the editorial staff of the *Railway Age*.

NEWS

Reply of N. I. T. League to Eastman Questionnaire

Holds that parity of regulation
is not practicable at the
present time

A special committee of the National Industrial Traffic League has prepared answers to questions concerning transportation regulation and co-ordination which were submitted to shippers on November 4 by Joseph B. Eastman, federal co-ordinator of transportation. Besides sending the answers to the co-ordinator, the league has forwarded copies to all its members, not especially as a guide as to how they should answer these questions individually but as a record of its collective opinion on the questions.

The league takes the position that, while permissive legislation for buses and trucks, air lines and other means of transportation, competitive with railroads might well be recommended to the coming session of Congress by the co-ordinator, parity of regulation as between the railroads and these newer instrumentalities is not practicable at the present time. Among the most vital of the suggestions of the league is that the Fourth section of the Interstate Commerce Act be repealed. Highlights of the league's document are as follows:

That the same character of regulation should not be applied to the railroads on the one hand and competing methods of transportation on the other;

That the trend toward parity in regulation as between the railroads and other agencies should be accomplished by releasing the railroads from much of their present federal regulation and leaving all agencies free of such regulation;

That restrictions against the railroads meeting competitive rates of other agencies on short notice be materially loosened;

That federal power over minimum rates be restricted to cases where it is found that lower rates would result in an actual burden on other traffic;

That the laws against the ownership of competitive water lines by railroads be retained, as well as those which forbid the railroads to own inland waterway facilities;

That while railroads should be permitted to make joint rates for through hauls involving rail, water, highway and other transportation facilities, and should be permitted to acquire other agencies to supplement their own facilities, they should not be permitted to acquire competitive agencies nor should joint rates as described be made mandatory;

That interstate motor truck and motor

bus transportation should not be regulated in the manner that railroads are now regulated. Such legislation should be largely permissive in character, although compulsory liability insurance on the part of all carrier agencies is desirable;

That although commercial highway vehicles should be required to pay, in taxes, their fair share of the cost and maintenance of the highways, it is necessary for privately-owned vehicles also to be made to bear their share in these costs through taxation;

That no further regulatory restrictions should be placed on domestic water lines and that no tolls should at present be levied against the traffic carried on such lines.

Freight Claim Division Meeting

The annual session of the Freight Claim division of the American Railway Association will be held in New York on May 22, 1934.

R.F.C. Loans to Railroads

Up to the end of November the Reconstruction Finance Corporation had disbursed \$390,271,767 in loans to railroads, according to its monthly report, and \$56,851,691 had been repaid.

Eastman Issues Questionnaire to Short Line Railroads

Co-ordinator Eastman has issued questionnaire to short line railroads intended to develop essential facts as to various phases of the short line problem, including their views on consolidation.

Liquor on Dining Cars

The serving of wines and liquors on dining cars, in states where the 21st amendment has made such service legal, is to be begun about December 15, according to the present plans of the railroads. Licenses are being sought from those states where licenses are given.

Passenger Fares Reduced In South

Reduced passenger fare tariffs filed by the Southern became effective on December 1, as proposed, after the Interstate Commerce Commission had voted not to suspend them as it had been requested to do in a protest filed by the National Association of Motor Bus Operators. The tariffs provide for coach fares of approximately one and one-half cents a mile and fares in Pullman cars of three cents a mile, without surcharge. The Seaboard Air Line met the Southern rate of 1½ cents but other southern lines put in a rate of two cents a mile for coach passengers.

St. Lawrence Waterway's Power Aspects Analyzed

Many phases unnoticed by public as
it sees cheap power just
around the corner

Power aspects of the proposed St. Lawrence seaway are subjected to critical analysis by Edgar A. Van Deusen and A. J. P. Wilson, consulting engineers, in an article entitled "White Coal" and the St. Lawrence" which appeared in the November 27 issue of "Barron's."

The St. Lawrence, the article points out, has been widely heralded as a source of power—a heralding which has caused "a large portion of the public to believe that power at bargain prices is just around the corner."

"What the public does not understand," it continues, "is that this power project calls for a tremendous expenditure of capital on the part of New York State; that the 'white coal' of the St. Lawrence is not so cheap as its friends would have us believe; that under certain conditions coal-burning power plants are more economical; that the St. Lawrence development, per se, could have little effect on the rates now charged residence electric consumers of the Empire State, and, finally, that, after being placed in operation, the St. Lawrence power plant would most likely incur huge annual deficits for many years."

The authors proceed to develop in turn each of the above-mentioned points. They agree that "the power project, so far as engineering is concerned, though a difficult and hazardous undertaking, is entirely feasible" and concede that "as a conservator of our diminishing coal and oil supplies, the project could doubtless be justified on the principle of ultimate national economy." They add, however, that cheap electricity for New York is another question.

First, the proposed St. Lawrence power block is gigantic in size; for 1932, if operated at capacity, it would have produced power equal to 10 per cent of all the power produced in the United States. "To fit this tremendous block of new power into the picture without detriment to present generating facilities and the capital investment they represent," the authors suggest, "will be a most difficult and delicate task. One of two things is likely to happen: Either the St. Lawrence will replace present equivalent facilities, with the resultant loss to investors, or the new plant must operate for many years at a deficit until the market for power catches up with the capacity of the plant."

While accepting for their analysis the
(Continued on page 829)

Ten Months Net Exceeds 1932 by 52.8 Per Cent

Return of 1.77 per cent compares with 1.15 per cent for same period of last year

Class I railroads for the first ten months of 1933 had a net railway operating income of \$398,238,658, which was at the annual rate of return of 1.77 per cent on their property investment, according to reports compiled by the Bureau of Railway Economics. In the first ten months of 1932, their net was \$260,616,478 or 1.15 per cent.

Operating revenues for the first ten

139, at the rate of 1.77 per cent. For the same period in 1932, their net amounted to \$16,730,795, at the rate of 0.60 per cent. Operating revenues in the Southern district for ten months amounted to \$325,026,327, an increase of 2.6 per cent, while operating expenses totaled \$242,893,949, a decrease of 8.3 per cent. For October they had a net of \$5,336,078, compared with \$5,500,226 in October, 1932.

Class I railroads in the Western district for ten months had a net of \$109,356,412, at the rate of 1.18 per cent. For the same ten months of 1932, they had a net of \$66,372,141, at the rate of 0.71 per cent. Operating revenues in the Western district for ten months amounted to \$939,736,500, a decrease of 3.5 per cent under the same period in 1932, while operating expenses

CLASS I RAILROADS—UNITED STATES

Month of October

	1933	1932	Per Cent Decrease
Total operating revenues	\$294,341,594	\$295,175,402	0.3
Total operating expenses	204,694,438	198,057,764	3.4*
Taxes	21,370,990	23,271,633	8.2
Net railway operating income	57,264,780	62,784,037	8.8
Operating ratio—per cent	69.54	67.10	..
Rate of return on property investment—per cent	1.71	1.87	..
Ten Months Ended October 31			
Total operating revenues	\$2,592,440,961	\$2,632,798,757	1.5
Total operating expenses	1,870,412,901	2,029,808,046	7.9
Taxes	221,524,606	240,216,100	7.8
Net railway operating income	398,238,658	260,616,478	52.8*
Operating ratio—per cent	72.15	77.10	..
Rate of return on property investment—per cent	1.77	1.15	..

* Increase.

months totaled \$2,592,440,961, compared with \$2,632,798,757 for the same period in 1932, a decrease of 1.5 per cent. Operating expenses amounted to \$1,870,412,901, a decrease of 7.9 per cent.

Class I railroads in the ten months paid \$221,524,606 in taxes, compared with \$240,216,100 for the same period in 1932, a decrease of 7.8 per cent. For October alone, the tax bill amounted to \$21,370,990, a decrease of \$1,900,663 under October, 1932.

Thirty-five Class I railroads failed to earn expenses and taxes in the first ten months of 1933, of which 7 were in the Eastern district, 10 in the Southern, and 18 in the Western district.

For October alone the net railway operating income was \$57,264,780, which, for that month was at the rate of 1.71 per cent. In October last year, the net was \$62,784,037 or 1.87 per cent. Operating revenues for October amounted to \$294,341,594, compared with \$295,175,402 in October, 1932, a decrease of three-tenths of one per cent, reflecting the discontinuance of the emergency surcharges. Operating expenses totaled \$204,694,438, an increase of 3.4 per cent.

Class I railroads in the Eastern district for ten months had a net of \$239,951,107 at the rate of 2.28 per cent. For the same period in 1932, their net was \$177,513,542, or 1.69 per cent. Operating revenues in the Eastern district for ten months totaled \$1,327,678,134, a decrease of 1.1 per cent below the corresponding period in 1932, while operating expenses totaled \$925,752,628, a decrease of 7.1 per cent. Railroads in the Eastern district for October had a net of \$27,691,050, compared with \$32,858,224 in October, 1932.

Class I railroads in the Southern district for ten months had a net of \$48,931,-

totalled \$701,766,324, a decrease of 8.7 per cent. For October the railroads in the Western district reported a net of \$24,237,652. The same roads in October, 1932, had a net of \$24,425,587.

Commutation Fare Held Not Unreasonable

Division 3 of the Interstate Commerce Commission has dismissed a complaint filed by Sidney Szerlip and others with a finding that the Erie's 60-trip monthly commutation passenger fare of \$13.60 over an interstate route between Nyack, N. Y., and New York City is not unreasonable or otherwise unlawful.

N. Y. Railroad Club Annual Dinner December 14

An attractive circular calling upon members to "Read this—then act fast!" has been issued by the New York Railroad Club in connection with its forthcoming annual dinner which is to be held at the Commodore Hotel, New York, on Thursday evening, December 14.

The circular promises to give all attending a "\$2,000 value for \$5" and further assures prospective ticket purchasers that they will receive "the best dinner in New York" while they mingle with "the finest fellows in the world—your friends of the railroad industry."

Entertainment features will include specialty numbers staged by well-known entertainers, and this feature members are advised not to miss since they would have "to spend four or five nights" and a considerable sum of money to see these performers where they are regularly engaged. C. E. Smith, vice-president of the New York, New Haven & Hartford, will act as master of ceremonies.

Saving from Relief Rates Estimated at \$5,000,000

Administrator calls co-operation of railroads "a splendid help to the program"

In announcing the agreements to reduce freight rates for surplus commodities transported in the program of the Federal Surplus Relief Corporation which had been reached between the railroads and the corporation, Harry L. Hopkins, president of the corporation and Federal Emergency Relief and Civil Works Administrator estimated that the savings to the government might run as high as \$5,000,000.

The Eastern Lines agreed to make reductions effective December 1 as follows: On all merchandise, other than coal and coke, a reduction of 25 per cent from the commercial rates; on coal and coke, a reduction of 20 per cent. The reductions are subject to a minimum of \$15 per car for road-haul service and to minimum earnings to be based on five mills per ton-mile computed on the basis of rate-making distances. The Western and Southeastern lines, whose rates for federal government shipments are already subject to reductions of from 35 to 40 per cent from commercial rates under federal land-grant and bond-aid laws, felt that through these reductions they were contributing fairly to the relief program. The Eastern lines, except in minor instances, are not subject to the federal land-grant or bond-aid reductions.

Mr. Hopkins pointed out that the reductions will result in making more money available for the purchase of commodities for the needy. The amount of the saving cannot be accurately computed in advance, he said, because it is not possible to know beforehand what the tonnage of the shipments will be.

"The co-operation of the railroads in making these reductions is a splendid help to the program of the Federal Surplus Relief Corporation," Mr. Hopkins said. "I have expressed my appreciation to Daniel Willard, chairman of the Special Committee of Eastern Presidents, Fred W. Sargent, chairman of the Special Committee of Western Presidents, and George B. Elliott, chairman of the Special Committee of Southeastern Presidents."

"Accomplishment of the two-fold purposes of the Federal Surplus Relief Corporation, first to relieve distress, and second, to absorb the Nation's surplus commodities, requires that the greatest economy be practised in order to reach the many thousands in need. It is recognized that the carriers in the last few years have suffered reduced earnings, as have the people; but the care of helpless and needy people is paramount to the matter of earnings. By granting a reduction in rates, the carriers are giving impetus to the relief of unemployment hardships for which the President and the people are so earnestly striving. The removal of surplus products to points of consumption will create for the carriers some revenue-producing tonnage which would otherwise be lost to them through destruction or disintegration of surplus commodities, and also tonnage which will more than cover the out-of-

pocket transportation cost, at the same time that it contributes to the easing of economic strain of the entire Nation."

Anthracite coal operators who are members of the Anthracite Institute have also agreed to furnish coal through the relief corporation at a reduction in price of 70 cents a ton and the bituminous operators, through subdivisional code authorities, have agreed to a reduction of 10 per cent from the N. R. A. code prices.

Cotton Rates Suspended

The Interstate Commerce Commission has suspended until July 1, 1934, tariff schedules proposing to cancel carload and any-quantity freight rates on cotton which had been published to meet motor truck competition and to apply in lieu thereof higher normal any-quantity rates on shipments moving via the Louisville & Nashville when in connection with lines of the Southern system.

R. C. C. Loans Reduced

Loans from the emergency revenues derived from freight rate surcharges pooled by the railroads, have been reduced to \$69,065,475, according to the financial statement of the Railroad Credit Corporation as of November 30, 1933, which was filed with the Interstate Commerce Commission. The corporation began liquidating on June 1 and E. G. Buckland, president of the corporation, in a letter accompanying the report, calls attention to the fact that the cash and special deposit accounts aggregate \$1,275,700, of which \$397,359 is available for general liquidating purposes.

New Name for Ohio Valley Shippers' Board

The Ohio Valley Shippers' Advisory Board, now called the Ohio Valley Transportation Advisory Board, will hold its regular meeting at the Brown Hotel, Louisville, Ky., on Tuesday, December 12. This is the tenth annual meeting, and officers will be elected for the coming year. At the noon luncheon, which will be sponsored by the Transportation Club of Louisville, Dr. C. S. Duncan, economist of the Association of Railway Executives, will speak on "Transportation and Government." The chairman of the Board is Roy Carson, of Louisville, Ky.; secretary, W. A. Gates, Louisville.

Settle Shopmen's Wage Dispute in Canada

A compromise has been reached in the wage dispute between the Canadian shop crafts employees, numbering some 35,000, and the Canadian railways. Both parties have agreed to a 15 per cent reduction from basic wages for one year, dating from December 16, thus bringing these employees' conditions in line with clerical and operating department employees who likewise have accepted a 15 per cent reduction for a year.

Employees whose bulletined working time is less than 40 hours per week will have only a 10 per cent reduction. At the end of one year the reduction will drop to 10 per cent for those workers who now take the 15 per cent. After October 16, 1934,

either party may serve 30 days' notice of a desire to change the percentage for the year following. Both parties expressed themselves as pleased at having been able to reach common ground.

580,000 C. C. C. Men Transported by Railroads

More than 580,000 Civilian Conservation Corps men have been transported by the railroads since the first enrollment began last spring, it was announced on November 29 at the office of Robert Fechner, director of emergency conservation work. This includes not only the men who were transported from their homes to points of enrollment and thence to various camps but also those who were moved to winter locations or back home during October. The entire task was accomplished without accident.

Expenditures for transportation up to September 30 amounted to \$6,260,920 for passenger movement and \$2,552,237 for freight, making a total of \$8,813,157. Since September 30, additional expenditures have been made amounting to approximately \$2,000,000. Exact figures showing the transportation figures for the past two months are not yet available.

During the first enrollment period, 64,196 men traveled long distances between corps areas, often completely across the

country; such trips were handled by the Quartermaster Corps in Washington. Of the 64,196 men thus transported, 55,130 were sent from the East to the West coast. It required 211 trains, 1,605 sleepers and 705 baggage cars to carry equipment for the over-night trips directed by the Quartermaster Corps. In October, 52,700 men were moved in 212 trains from the West to the South and East and 43,600 in 114 trains were moved from the East to the West and Southwest.

Each train carried an Army physician and, for instances in which the trip was longer than one day, a temporary kitchen and supplies. In addition to the railroad mileage run-up, there was considerable transportation from station points to camps in trucks and busses.

Net Deficit for Nine Months \$39,296,496

The net deficit of the Class I railways, after interest and fixed charges, had been reduced to \$39,296,496 for the first nine months of the year, according to the Interstate Commerce Commission's monthly compilation of selected income and balance sheet items. For the corresponding period of last year the deficit was \$164,283,471. For the month of September there was a net income after charges of \$16,791,298, as compared with \$6,637,459 in September, 1932.

SELECTED INCOME AND BALANCE-SHEET ITEMS OF CLASS I STEAM RAILWAYS

Compiled from 145 reports (Form IBS) representing 150 steam railways

TOTALS FOR THE UNITED STATES (ALL REGIONS) †

For the month of September		Income Items		For the nine months of	
1933	1932			1933	1932
\$60,936,369	\$48,947,043	1. Net railway operating income.....	\$340,973,877	\$197,832,411	
13,145,523	14,668,579	2. Other income	128,379,590	148,977,745	
74,081,892	63,615,622	3. Total income	469,353,467	346,810,156	
11,324,728	10,894,648	4. Rent for leased roads.....	99,294,713	96,432,925	
44,173,098	44,284,578	5. Interest deductions	398,731,253	396,232,359	
1,792,768	1,798,937	6. Other deductions	10,623,997	18,428,343	
57,290,594	56,978,163	7. Total deductions	508,649,963	511,093,627	
16,791,298	6,637,459	8. Net income	39,296,496	164,283,471	
		9. Dividend declarations (from income and surplus):			
6,755,422	1,281,894	9-01. On common stock	46,210,217	53,753,480	
	104,981	9-02. On preferred stock	10,189,146	13,203,120	

BALANCE-SHEET ITEMS

Selected Asset Items

	Balance at end of September	
	1933	1932
10. Investments in stocks, bonds, etc., other than those of affiliated companies (Total, Account 707).....	\$754,016,191	\$761,425,129
11. Cash	332,780,845	297,689,734
12. Demand loans and deposits.....	41,092,100	35,541,719
13. Time drafts and deposits.....	50,679,529	31,413,608
14. Special deposits	38,087,148	37,377,353
15. Loans and bills receivable.....	10,343,641	18,916,621
16. Traffic and car-service balances receivable.....	50,184,367	45,480,106
17. Net balance receivable from agents and conductors.....	44,340,749	40,368,669
18. Miscellaneous accounts receivable.....	134,806,719	145,295,992
19. Materials and supplies	292,627,282	328,922,859
20. Interest and dividends receivable.....	40,930,105	39,093,805
21. Rents receivable	2,921,469	3,090,970
22. Other current assets	4,719,384	8,297,587
23. Total current assets (Items 11 to 22).....	1,043,513,338	1,031,489,023

Selected Liability Items

24. Funded debt maturing within six months*.....	119,668,675	162,364,837
25. Loans and bills payable.....	338,242,425	278,946,614
26. Traffic and car-service balances payable.....	68,523,340	62,852,078
27. Audited accounts and wages payable.....	203,258,267	199,641,046
28. Miscellaneous accounts payable.....	57,965,825	61,966,720
29. Interest matured unpaid	223,607,024	172,349,018
30. Dividends matured unpaid	15,278,621	15,238,991
31. Funded debt matured unpaid	98,165,292	51,305,644
32. Unmatured dividends declared	833,523	878,669
33. Unmatured interest accrued	107,808,376	107,350,814
34. Unmatured rents accrued	29,150,591	29,091,957
35. Other current liabilities	17,907,658	19,430,145
36. Total current liabilities (Items 25 to 35).....	1,160,740,942	999,051,696

† Excludes returns for Class I Switching and Terminal Companies.

* Includes payments which will become due on account of principal of long-term debt (other than that in Account 764, Funded debt matured unpaid) within six months after close of month of report.

‡ Includes obligations which mature less than two years after date of issue.

d Deficit.

Low Fares for Christmas

The Eastern trunk lines, in a joint advertisement, announce that round trip tickets for the Christmas holidays will be put on sale December 14 (continuing to January 1), and that the return time limit will be January 15. These tickets will be good on all trains, and there will be liberal stop-over privileges on the return. The round trip rate is one and one-ninth the one-way fare. This rate will be good generally throughout the United States, Canada and Mexico.

To all points, from the Atlantic Coast as far as Chicago and St. Louis, and also to the southeast, Pullman rates for the round trip will be one fare plus one-half.

Government Loan for Philadelphia-Camden Transit Line

Allotment of a loan and grant by the Public Works Administration of \$11,900,000 to the Delaware River Joint Commission of Pennsylvania and New Jersey for construction and equipment of a rapid transit shuttle line across the Delaware river bridge between Philadelphia and Camden has been announced by the Public Works Administrator, Harold L. Ickes. The allotment, which is subject to a contract satisfactory to PWA, includes a loan of \$10,000,000 and a grant of 30 per cent of the cost of labor and materials. Labor and materials are estimated at \$6,347,000. The loan is to be secured by 4 per cent general obligation bonds supported by revenues of the Delaware river bridge.

Bus Association Aroused by Reduced Rail Fares

A. M. Hill, president of the National Association of Motor Bus Operators, has called a special meeting of the board of directors to be held in Washington on December 14, at which, in addition to discussing operation of the bus code, the board will be asked to consider and decide upon a policy with respect to the recent action of the southern and western railroads in reducing passenger fares. The notice says the question for the board to decide is whether the association should institute formal proceedings before the Interstate Commerce Commission for an investigation to determine whether the reduced rates which became effective on December 1 can be made compensatory, and, in the event this procedure is approved, if formal petition by the association and the Motor Bus Code Authority should be made to General Johnson, administrator of the N. R. A., to intervene as a party in interest. A further question is whether the association and the code authority should petition General Johnson to exempt from the provisions of the code motor bus companies operating in territories where the low rail fares are in effect.

The Canadian Roads in October

Net operating revenue totaling \$2,542,586 is shown in the monthly report of the Canadian National for October which is a decrease of \$150,140 as compared with October, 1932, but an increase of \$483,728 over the earnings for September, 1933.

Gross revenues in October were \$14,662,314, a decline of \$866,667 from October, 1932. Operating expenses, which in Octo-

ber this year were \$12,119,728 showed a decrease of \$716,527 from the operating expenses of the corresponding month of last year.

For the period from January 1 to October 31, inclusive, net revenue was \$3,449,958, a decrease of \$1,844,597 as compared with the same period of 1932. Gross for the 1933 period totaled \$122,878,594, a decline of \$13,271,846 and operating expenses \$119,428,636, a decline of \$11,427,249.

The Canadian Pacific had net operating revenue of \$4,058,447 in October, as compared with \$3,923,573 a year ago, an increase of \$134,873. The increased net is entirely due to reduced expenses, since operating revenues fell by \$295,233 to \$11,984,497, while operating expenses were reduced by \$430,107 to \$7,926,050.

For the ten months of the current year ended with October, the company's gross was \$93,967,027, a reduction of \$9,537,654 from the corresponding period of a year ago. Operating expenses, however, were reduced by \$9,112,610 to \$79,937,128, leaving net for the period of \$14,029,898, as compared with \$14,454,943 last year, a decrease of \$425,044.

Dean Potter Added to Committee on Railway Research

Dean A. A. Potter of Purdue University has been added to the Committee on Railway Research of the Science Advisory Board, according to an announcement by Dr. Karl T. Compton, Chairman of the Board.

Dean Potter is president of the American Society of Mechanical Engineers and an authority on steam engineering at Purdue University, whose laboratories have long been famous for their co-operation with railroads and railroad equipment companies in engineering research and tests. This committee, chosen from among the leading directors of industrial research in the country, was formed at the request of Joseph B. Eastman, federal co-ordinator of transportation, to co-operate with a corresponding committee of railroad executives.

"This co-operation," said Dr. Karl T. Compton, "should go far toward convincing the public that the railroads are making a determined effort to improve their service to the public and to strengthen their financial position by taking maximum advantage of modern technology. To bring this about, these leaders of industrial research have agreed, without compensation and for the public good, to co-operate with the railroad executives in an effort to map out the best plan that their joint knowledge and experience can devise, and to assist in putting this plan into operation. Contrary to certain reports, there is no suggestion or probability of forcing on the railroads a huge central research laboratory."

According to Dr. Compton, the probable approach of these joint committees will be a survey of the research facilities and procedures now existing in the railroad and equipment companies and a comparison of these with the similar bases of research in outstandingly successful industries. The object will be to determine whether the principles of scientific research are being applied in the railroad industry as thor-

oughly and effectively as is reasonably practicable, and, if not, how this situation can best be corrected. The survey will not be shaped or guided by preconceived ideas, and will be carried on with full realization that the conclusions reached must fit the peculiar conditions of the railroad industry.

In addition to Dean Potter, the committee of the Science Advisory Board consists of Dr. F. B. Jewett, president, Bell Laboratories, Inc., as chairman; Maurice Holland, director of the Division of Engineering and Industrial Research of the National Research Council, as director; Dr. C. F. Kettering, vice-president and director of research of the General Motors Corporation; Dr. John Johnson, director of research of the U. S. Steel Corporation; Dr. E. K. Bolton, chemical director of the du Pont Company; Dr. Francis Frary, director of research of the Aluminum Company of America; Dr. H. G. Moulton, president of the Brookings Institution; R. L. Lockwood, director of purchases for the Federal Co-ordinator of Transportation; Dr. D. C. Jackson, head of the electrical engineering department of M. I. T.; also Dr. Isaiah Bowman, chairman of the National Research Council.

W. & L. E. Files Store-Door Tariff; Others to Follow

Since the Interstate Commerce Commission on November 27 announced that it had voted not to cancel the store-door collection and delivery tariffs filed by the Pennsylvania, the Grand Trunk and the Erie, another tariff providing for l.c.l. door-to-door service has been filed by the Wheeling & Lake Erie. The Wheeling tariff, while contemplating a collection and delivery plan similar to that installed on December 1 by the other roads mentioned above, publishes a minimum rate of 25 cents per 100 lbs. for traffic receiving pick-up and delivery and does not fix mileage limits for traffic eligible to receive the service at present station-to-station rates. The other tariffs publish minimum rates of 35 cents per 100 lb. and, in addition, charges for pick-up and delivery on traffic moving beyond 260 miles from points of origin.

The Chesapeake & Ohio, the New York, Chicago & St. Louis and the Pere Marquette, which, as announced in the *Railway Age* of December 2, have obtained permission from the Interstate Commerce Commission to file pick-up and delivery tariffs, to become effective on one day's notice, are now planning to file such tariffs in the near future as also is the Monon. The Delaware, Lackawanna & Western which has obtained permission to file on five days' notice, is understood to be planning no further action at this time but, like other eastern roads, will await developments and a study of the experience of those lines which have installed the service.

The Traffic Club of Massachusetts has filed a complaint with the commission attacking the store-door service of the Boston & Maine and the Boston & Maine Transportation Company, alleging that it is discriminatory against classes of traffic not accorded the service and is accomplished through operation of the subsidiary at a loss.

St. Lawrence Waterway's Power Aspects Analyzed

(Continued from page 825)

\$89,726,000 named in official estimates as the cost of the power development, the authors nevertheless call attention to the fact that such official estimates in the past have been notably below the final costs of similar projects. A table shows that the actual cost of Muscle Shoals was 134 per cent in excess of the official estimate; the over-run on the New York State Barge Canal was 73 per cent, exclusive of interest during construction, and that on the Panama Canal was 134 per cent. Thus while they feel that the "safest procedure would be to double the estimated cost of constructing the St. Lawrence power project" the authors nevertheless adhere to the \$89,726,000, "thus giving the benefit of the doubt to the champions of the cause." Costs on the basis of this \$89,726,000 are then compared with present-day costs in modern efficient steam plants.

The project contemplates for New York State an installed capacity in hydro-turbines and electric generators of 1,100,000 hp. Placing fixed charges at 6.89 per cent and annual plant operating costs at \$66,000, figures developed in the "Marketing Board Report" of the "St. Lawrence Power Development Commission" the authors tabulate the cost per kw.h. at the bus bar, assuming load factors from 100 per cent down to 10 per cent. Steam-plant generating cost at different load factors are similarly tabulated. The tabulated estimates of cost per kw.h. for the St. Lawrence development are shown to be lower than the unit cost shown for modern steam plants but in this latter connection the comment is made, and supported by a chart, that "the costs of producing electricity in coal-burning stations is being lowered year by year."

The authors find the most striking feature of the tabulation to be the influence of load factor on costs. They point out that the average load factor for steam plants in New York was only 25 per cent in 1931 while the load factor of hydro-electric plants there averaged 51 per cent in 1931 and 49 per cent in 1932.

At a 20 per cent load factor (residence load), the article continues, the St. Lawrence figure is 7.3 mills per kw.h. and the steam plant figure is 9.5 mills, a difference of 23 per cent in favor of the St. Lawrence; at 60 per cent load factor the difference in favor of the St. Lawrence is 47 per cent. Continuing in this connection the article says:

"But this represents only the reduction in costs up to the bus bar of the generating station and is by no means a measure of the total costs to the ultimate consumer. And this is the crux of the situation, the point where many fail in a correct interpretation of power costs.

"A true comparison of St. Lawrence with steam-plant costs must consider an additional and most important element, viz., transmission from power plant to load center. A steam plant is usually located approximately at load-center, but St.

Lawrence is located in a far corner of New York State remote from any load-center, and the power generated must be stepped-up to a higher voltage and then transmitted many miles before it can be used by the homes, farms, and factories of the state.

"With these transmission costs added, it is estimated that St. Lawrence power is cheaper than present steam power, within 50 to 150 mi., depending upon the load factor. Beyond 150 mi. it is difficult to see how St. Lawrence could possibly compete with a modern coal-burning station.

"But we must go still further than this, and consider that the consumers' bill is not made up of generation and transmission costs alone, but, in addition, distribution, utilization, commercial and new business, taxes, and general administrative expenses. These expenses are a vital and essential part of the consumers' bills and are not changed one iota by cheaper generating costs.

"We can now ask the question: What effect, then, would cheaper generating costs have on the bill of the average domestic consumer? All utility men know that, desirable as is the increase of efficiency and economy in power generation, yet it represents an improvement in that major division of total costs which is the smallest.

"An analysis of typical electric-utility companies operating in New York State, as reported to the Public Service Commission, shows that total generating costs, including fixed charges, approximate less than 25 per cent of total costs. Thus if St. Lawrence could achieve a savings of 50 per cent in generating costs over present costs, its effect on the average consumers' bills would be a cut of only 12½ per cent. And even if St. Lawrence power were given away free, it would mean only a 25 per cent cut in the consumers' electric bills.

"As a matter of fact, it is most probable that St. Lawrence costs will exceed the figures cited in this article. First, because the cost of construction of the project will in all likelihood exceed \$89,760,000 and may possibly approach \$120,000,000. Second, because the estimated figure of 6.89 per cent for fixed charges is low, particularly if St. Lawrence is to be used as a 'yardstick,' for then certainly the equivalent for taxes should be included, and a figure of 10 per cent would be nearer the truth.

"On the basis of these corrections the generating costs of St. Lawrence power would increase 70 per cent, and approach within one mill of present day steam costs. Add to this the transmission costs discussed above, and the claims of St. Lawrence as the answer to cheap power vanish into nothingness."

The authors concede in closing that there is room for improvement in public utility rates but they see the answer, for the everyday consumer, not in lower generating costs but rather in an improved domestic load factor. This latter, they add, means a completely electrified home with an investment per family of from \$500 to \$2,000 in appliances and "the fact that most families cannot afford the investment is one of the greatest obstacles to cheap electric rates in the average home."

Equipment and Supplies

IRON AND STEEL

THE MISSOURI PACIFIC has ordered 500 tons of structural steel for a bridge at Rio Vista, Ark., from the American Bridge Company.

THE WESTERN MARYLAND has placed orders for 2,000 tons of 90-lb. A. S. C. E. rail and for 4,800 pairs of 100 per cent rail joints.

THE MISSOURI PACIFIC has been granted authority by Federal Judge Charles B. Faris to purchase 25,000 tons of rails and fastenings, the cost to be financed by the company from earnings.

THE NORTHERN PACIFIC has ordered 6,500 tons of rails, placing 4,000 tons with the Illinois Steel Company, 2,000 with the Bethlehem Steel Company and 500 with the Colorado Fuel & Iron Company.

THE CLINCHFIELD has placed an order for 500 tons of 100-lb. rail for immediate shipment with the Tennessee Coal, Iron & Railroad Company. The railroad plans to place an order later for 2,000 tons of rail.

PITTSBURGH & WEST VIRGINIA.—This road has applied to the Interstate Commerce Commission for authority for an expenditure of \$47,000 to be borrowed from the Public Works Administration for the purchase of 1,000 tons rails and necessary fastenings, ordered from the Carnegie Steel Company, on a promissory note without collateral.

Pennsylvania Places Orders for 100,350 Tons of Rail

The Pennsylvania has placed contracts for 100,000 tons of steel rail for delivery on or before July 1, 1934, which have been awarded as follows: Bethlehem Steel Company, 44,000 tons, Inland Steel Company, 6,000 tons, Illinois Steel Company, 8,000 tons and Carnegie Steel Company, 42,000 tons. In addition to this a contract has been entered into with the Bethlehem Steel Company for the rolling of 350 tons of girder rail for use in city streets.

MISCELLANEOUS

PENNSYLVANIA—Orders are being issued by this road for the purchase of cross-ties; the railroad has a surplus of ties on hand, and for the present the orders are being confined to oak ties only. Purchasing Agent C. E. Walsh, Philadelphia, Pa., is endeavoring to make an equitable distribution of the orders among the farmers and other owners of woodland along the right-of-way. The Pennsylvania normally uses 3,000,000 ties annually and as the surplus is liquidated the number and kinds of ties ordered will be increased.

Construction

LEHIGH VALLEY.—The Ithaca road crossing of this railroad in the town of Horseheads, Chemung county, N. Y., located about a quarter of a mile north of Horseheads station on the Erin-Horseheads county highway, has been designated for elimination by the New York Public Service Commission. This is to be accomplished by constructing a marginal highway about 2355 ft. long, at an estimated cost of \$29,400, including \$5,800 for land and property damages. The State Department of Public Works is directed to prepare plans and to carry out all of the work involved. The commission has also affirmed its order directing the Lehigh Valley to eliminate the Ridge road crossing of its tracks in the town of West Seneca, Erie county, N. Y. The estimated cost when this elimination was directed in 1929 was \$102,900, not including the land, which had already been acquired.

LEHIGH VALLEY.—A general order of the New York Public Service Commission made in 1930 directing the elimination of the Tioga street crossing of this road in the village of Spencer, Tioga county, has been affirmed by the commission. The estimated cost of the elimination is \$121,200, of which \$11,960 was estimated for work other than necessary for the elimination. The railroad share will be about \$54,000. The commission also reaffirmed its order of four years ago for the elimination of the Alpine crossing of this road in Cayuta, Schuyler county, N. Y. A prescribed plan in 1930 estimated the cost to be \$129,000 of which about \$11,800 was the cost of changes other than necessary for the elimination. The railroad company's share of the cost would be about \$58,600. The commission also reaffirmed its previous order in directing the elimination of the Lake street crossing of this road in the village of Burdett, Schuyler county, N. Y. The cost of the work as ordered including land and property damages was estimated to be \$94,130 of which about \$2,150 would be for changes other than necessary for the elimination. The railroad company's share would be about \$46,000. The commission has also ordered the elimination of the Creedon crossing of this road in the town of Newfield, Tompkins county, N. Y.

NEW YORK CENTRAL.—The New York Public Service Commission has designated for elimination the Sixth, Fifth, South Ann and South Second streets crossings of this road in Little Falls, Herkimer county, N. Y. The commission directs that these crossings be eliminated by closing them and diverting traffic to an overcrossing for vehicular and pedestrian traffic and to a pedestrian subway to be constructed. The work includes extending Albany street to connect the overcrossing with existing streets. The estimated cost of this project is \$531,700, of which \$297,400 is for construction and \$234,300 for land and property damages. The commission also designated for elimination the Belle Isle crossings of this road and the West Shore located west of Belle Isle station in the town of Camillus, Onondaga

county, N. Y. These crossings are to be eliminated by raising the highway and carrying it over the grade of the railroads at the location of the present crossings as provided in a plan presented by the State Department of Public Works. This calls for plate girder spans 88 ft. long over each railroad, a deck girder span 68 ft. long over Nine Mile creek and 12 concrete beam spans of varying lengths between the two railroads and on the approaches. The estimated cost of the project is \$150,600, exclusive of land and property damages.

PENNSYLVANIA.—A contract has been awarded to the John S. Thompson Construction Company, Chicago, for the construction of the south wing walls of 20 street subways on the Englewood Connecting Railway at Chicago.

PENNSYLVANIA.—The New York Public Service Commission has affirmed its order directing the elimination of the Jamison road crossing of this railroad in the town of Elma, Erie county, N. Y. The order now affirmed directs the elimination of the crossing by elevating the tracks and placing the highway below them at a point 69 ft. south of the present crossing. The estimated cost of the work is \$170,000.

PENNSYLVANIA-LEHIGH VALLEY.—The designation of three railroad grade crossings in Stanley, Ontario county, N. Y., for elimination has been affirmed by the New York Public Service Commission. These are the Main street crossings of the Pennsylvania and the Lehigh Valley and the Seneca or Union street crossing of the Pennsylvania. The order now provides for the elimination of these crossings by constructing a subway under the Pennsylvania tracks at a point about 400 ft. southeast of the Lehigh junction, at an estimated cost of \$106,852 exclusive of land and property damages.

Supply Trade

John B. Campbell, special representative of the receiver of the **Pettibone Muliken Company**, Chicago, has been appointed general manager to succeed **C. H. Eib**, resigned.

Herbert S. Balliet, consulting engineer, has moved his Signal Development Bureau from the Grand Central Terminal, New York City, to 7 Benson avenue, West Nyack, N. Y.

Simon M. Dolan has been appointed district manager of the **Western Railroad Supply Company**, Chicago, in the St. Louis territory. Mr. Dolan has his office in the Railway Exchange building, St. Louis, Mo.

N. R. A. Codes

A hearing on the code of fair competition proposed to the National Recovery Administration by the railway safety appliance industry is to be held at Washington on December 11 before Deputy Administrator H. O. King. A hearing on the proposed code for the steel plate fabricating industry was held on December 5 and one on the code for the railway brass car and locomotive journal bearings and castings

industry was held on December 6. Codes for the anti-friction bearing industry, the malleable iron industry and the cement industry have been approved by the President.

United States Steel Corporation Executive Changes

Myron C. Taylor, on January 1 next, will retire as chairman of the Finance Committee of the United States Steel Corporation, and will be succeeded in that capacity by William J. Filbert, now vice-chairman of the Finance Committee. Mr. Taylor will continue his other offices as



Myron C. Taylor

chairman of the board of directors and chief executive officer. Mr. Taylor was born on January 18, 1874, at Lyons, N. Y., and was graduated from Cornell University in 1894. He was educated in law but his chief interests have been in business. He was associated with the textile industry in New England and was for many years a prominent figure in various large enterprises serving as president or a director



William J. Filbert

of a number of industrial organizations. Mr. Taylor was appointed chairman of the Finance Committee in 1927, and since that time has been active in carrying out the reorganization program he devised. In March, 1932, Mr. Taylor, then a director and chairman of the Finance Committee, was elected also to the office of chairman of the board, with duties similar to those formerly exercised by the late Judge Gary,

and at that time he assumed the full executive direction of the corporation.

William J. Filbert was born at Palatine, Ill., and was educated in the public schools of his native city and high school in Chicago. He began his business career in 1881, as a clerk in the purchasing department of the Chicago & North Western, at Chicago. He later entered the accounting department of that road, attaining the position of chief accountant before he left in 1898, to become assistant auditor and shortly thereafter auditor of the Federal Steel Company. This company was merged in 1901, with others to form the United States Steel Corporation and after this formation Mr. Filbert became assistant controller serving in that capacity until June, 1902, when he was made controller. Since January 26, 1932, he has served as vice-chairman of the Finance Committee and now becomes chairman of that committee. He has been a director of the corporation since December, 1919, and a member of the Finance Committee since April, 1922. Mr. Filbert was the first secretary of the American Iron & Steel Institute, and in 1931, was honored by that body when he was awarded the Gary Memorial Medal for outstanding service in the interest of the Institute.

The United States Steel Corporation announces that Eugene W. Pargny, since 1909 president of the American Sheet & Tin Plate Company, a subsidiary of the corporation, has asked to be relieved of his duties on January 1, retiring under the corporation's pension plan. The Finance Committee of the corporation has recommended that C. W. Bennett, vice-president of the American Sheet & Tin Plate Company since 1925, and acting president since January, 1933, be elected to succeed Mr. Pargny.

OBITUARY

George E. Sevey, manager of railroad sales of the Otis Steel Company, Cleve-

land, Ohio, with headquarters at Chicago, died on November 30. He had been ill for several months.

William Sherwood Bostwick, of Waynesboro, Pa., formerly vice-president and general manager of Magnus Company, Inc., New York, died on November 28, at his home following a short illness from pneumonia. Mr. Bostwick was born at Duplain, Mich., on February 5, 1858. He went to Waynesboro in September, 1917, and with his son-in-law, Chester A. Lyon, took over the Waynesboro Foundry & Machine Company, under the name of Bostwick-Lyon Bronze Company. In 1923, the Bostwick-Lyon Bronze Company merged with the Chicago Bearing Metal Company, of which concern he was director and vice-president and three years later these companies merged with the Magnus Company, Inc. Mr. Bostwick had served as vice-president and general manager of the Magnus Company, Inc., and three years ago retired from active business.

Calvert Townley, well-known electrical engineer and a former vice-president of the Westinghouse Electric & Manufacturing Company, died suddenly, of a heart attack, on November 27 in New York, in his seventieth year. A graduate of the Sheffield Scientific School of Yale, Mr. Townley became identified with the Westinghouse Electric & Manufacturing Company at the age of 23, and remained with that organization, with the exception of a short period, until his retirement. During his service with the company he became interested in a large number of utility corporations and in 1904 he left the Westinghouse company to participate in the management of his utility interests. Until 1911 he was consulting engineer for the New York, New Haven & Hartford in planning the electrification of railroad lines leading out of New York. He later returned to the Westinghouse company to become vice-president and assistant to the president. Mr. Townley is a past president of the American Institute of Electrical Engineers.

* * *

Financial

ATCHISON, TOPEKA & SANTA FE.—Control of Subsidiary.—The Interstate Commerce Commission has authorized a modification of a lease by which it controls the California, Arizona & Santa Fe reducing the annual rental paid by \$13,000.

ATCHISON, TOPEKA & SANTA FE.—Preferred Dividend.—The directors of this company have declared a dividend of \$3.30 on its 5 per cent preferred stock. A previous disbursement of \$1.50 has already been made this year, bringing the total to \$4.80. Payments on this stock are based on earnings for the fiscal year ended June 30 and these, the company announced, were just sufficient to cover this dividend.

CHICAGO, BURLINGTON & QUINCY.—Dividend.—The directors of this company have declared a dividend of \$3 a share on its stock, the first declaration since \$3 was paid in June, 1932.

MISSOURI PACIFIC.—Abandonment.—The Interstate Commerce Commission has authorized this company to abandon a part of a branch line extending from Fredonia, Kans., southerly to Peru Junction, 40 miles.

NEXPERCE & IDAHO.—P. W. A. Loan.—This company has applied to the Interstate Commerce Commission for authority for the expenditure of the proceeds of a proposed loan of \$6,400 from the Public Works Administration for the purchase of 10,000 ties and 20,000 feet of bridge timber.

Average Prices of Stocks and of Bonds

	Dec. 5	Last week	Last year
Average price of 20 representative railway stocks..	38.78	36.43	24.20
Average price of 20 representative railway bonds..	64.80	62.83	55.61

Dividends Declared

Atchison, Topeka & Santa Fe.—Preferred, \$3.30, payable February 1 to holders of record December 29.

Beech Creek.—50c, quarterly, payable January 2 to holders of record December 15.

Boston & Providence.—\$2.125, quarterly, payable January 2 to holders of record December 20.

Carolina, Clinchfield & Ohio.—\$1.00, quarterly, payable January 1 to holders of record December 11.

Guaranteed Certificates.—\$1.25, quarterly, payable January 10 to holders of record December 31.

Cincinnati Union Terminal Co.—5 Per Cent Preferred, \$1.25, quarterly, payable January 2 to holders of record December 21.

Grand Rapids & Indiana.—\$2.00, semi-annually, payable December 20 to holders of record December 9.

Little Miami.—Special Guaranteed, \$.50, quarterly; Original Guaranteed, \$1.10, both payable December 9 to holders of record November 25.

New York & Harlem.—\$2.50, semi-annually; Preferred, \$2.50, semi-annually, both payable January 2 to holders of record December 15.

North Central.—\$2.00, semi-annually, payable January 15 to holders of record December 30.

Philadelphia, Baltimore & Western.—\$1.50, semi-annually, payable December 30 to holders of record December 15.

Philadelphia & Trenton.—\$2.50, quarterly, payable January 10 to holders of record December 30.

Pittsburgh, Fort Wayne & Chicago.—\$1.75, quarterly; Preferred, \$1.75, quarterly, both payable January 2 to holders of record December 11.

Rensselaer & Saratoga.—\$4.00, semi-annually, payable January 2 to holders of record December 15.

West Jersey & Seashore.—\$1.50, semi-annually, payable January 2 to holders of record December 15.

West New York & Pennsylvania.—\$1.50, semi-annually; Preferred, \$1.25, both payable January 2 to holders of record December 30.



Illuminated Action Display of the C. & N. W. at Milwaukee, Wis.

This attention-arresting outdoor advertisement depicts a night scene in full color—the locomotive wheels revolve, the smoke puffs from the stack, and the steam exhausts. The board, on which the advertising message at the right is changed each month, is said to be the first of its kind and design used in outdoor advertising, and was originated by Klau-Van Pietersom-Dunlap Associates, Inc., with the use of Scene-in-Action Corporation equipment.

Railway Officers

EXECUTIVE

Edwin M. Rine, vice-president and general manager of the Delaware, Lackawanna & Western, with headquarters in New York, will retire from active service at the end of the year.

E. W. Scheer, vice-president in charge of operation and maintenance of the Central of New Jersey at Philadelphia, Pa., has also been elected to the same position on the Wharton & Northern and the Mount Hope Mineral Railroad, with the same headquarters.

OPERATING

H. G. Odell, superintendent of the Wichita (Kan.) Terminal Association, has been appointed superintendent of the Wichita Union Terminal, to succeed **W. G. Sims**, deceased.

FINANCIAL, LEGAL AND ACCOUNTING

H. W. Burtness, who has been elected secretary of the Chicago Great Western in addition to his duties as assistant to the president, as noted in the *Railway Age* of November 2, was born on November 16, 1897, at Chicago. After graduating from high school he attended evening sessions of the Metropolitan Business College and the LaSalle Extension University school of traffic. He first entered railway service with the Chicago, Burlington & Quincy,



H. W. Burtness

being connected with the office of the auditor of ticket accounts for a year. Next he spent seven years in various clerical capacities with the Pennsylvania, leaving this company in August, 1922, to join the Chicago Great Western as secretary to the president. Mr. Burtness served in this capacity under four presidents of the Great Western and on July 1, 1933, he was promoted to assistant to the president which

position he still holds in addition to that of secretary. He has also served as secretary of the Western Association of Railway Executives and of the Chicago Railroad Presidents' Conference. Mr. Burtness has his headquarters at Chicago.

ENGINEERING AND SIGNALING

Milton A. Baird, signal engineer of the Erie, who has been appointed superintendent of telegraph and signals, as noted in the *Railway Age* of November 11, was born on July 15, 1870, at Cuddebackville, N. Y. He entered railway service in 1887 as a laborer on the Erie, later serving as



Milton A. Baird

a blacksmith, signal foreman, signal maintainer and signal supervisor. In 1907, Mr. Baird was appointed a signal inspector, and two years later he became a signal supervisor. In September, 1911, he was advanced to general inspector of signals and in October, 1915, he was made chief inspector of signals. Mr. Baird has been signal engineer of the Erie since May, 1917.

MECHANICAL

Benjamin E. Jones has been appointed master mechanic motor equipment of the Erie and its subsidiaries, with headquarters at Susquehanna, Pa.

TRAFFIC

L. D. Nicholson, assistant general freight agent on the Missouri Pacific, with headquarters at St. Louis, Mo., has been appointed general agent at Dallas, Tex., to succeed **Guy A. Deuel**, deceased. **M. F. Coorssen**, who has been connected with the traffic department of the Missouri Pacific at Kansas City, Mo., has been appointed general agent at Louisville, Ky., to succeed **H. E. Woodworth**, deceased.

SPECIAL

H. C. Murphy, formerly assistant superintendent of the Chicago, Burlington & Quincy, at Denver, Colo., who has been on special duties for several months, has been appointed superintendent of safety,

with headquarters at Chicago. **T. E. Pratt**, superintendent of safety and chief special agent, will continue in the latter position.

OBITUARY

Walter H. Brewer, assistant to the general manager of the Coast Lines of the Atchison, Topeka & Santo Fe., with headquarters at Los Angeles, Cal., died on December 2 at the Santa Fe hospital at Los Angeles.

Andrew Stevenson, formerly president of the Jacksonville & Havana and the Chicago, Springfield & St. Louis, died on November 29 at Los Angeles, Cal. Mr. Stevenson was born on June 28, 1879, at Bayonne, N. J., and received a public school and business college education. He first entered railway service in 1890 with the Wabash at Des Moines, Iowa, later serving in various capacities with the Chicago, Burlington & Quincy and the Chicago & Eastern Illinois. From 1898 to 1905 he was chief rate clerk for the Western Passenger Association at Chicago. After acting as state manager of an insurance company for the next two years, he became vice-president and general manager of the Iowa Light & Traction Company and general manager of the Iowa Construction Company. He became president and treasurer of the Jacksonville & Havana following its organization in 1925, retiring from the service of this company in 1926. Mr. Stevenson served also for a time as president of the Chicago, Springfield & St. Louis. He was founder of a chain of banks in Alaska and was author of the Stevenson plan for the consolidation of the railroads of the United States under the Transportation Act of 1920.

M. Dailey, retired vice-president in charge of operation of the Chicago & Illinois Midland, whose death on November 28 was noted in the *Railway Age* of December 2, was born on March 7, 1865, at Galesburg, Ill. He entered railway service in 1881 as a machinist apprentice on the Chicago, Burlington & Quincy, later serving as a locomotive fireman and engineer on this road. In 1888 he went with the Chicago Great Western where subsequently he was advanced to superintendent of terminals and then to division superintendent. In August, 1912, he was appointed general superintendent of the Missouri, Oklahoma & Gulf (now the Kansas, Oklahoma & Gulf) and in August, 1913, he became general manager of the Muscatine North & South later serving as general manager and receiver, and as president and general manager of this road and its successor, the Muscatine, Burlington & Southern. Mr. Dailey returned to the Missouri, Oklahoma & Gulf in 1917 as general superintendent and in 1918 he became vice-president of the Edmonton, Dunvegan & British Columbia, at Edmonton, B. C. Two years later he returned to the United States as general manager and traffic manager of the Chicago & Illinois Midland. In May, 1926, he was made vice-president in charge of operation, which position he held until his retirement in 1932.



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Old power slows up operation and runs up transportation expense. ● Economical, modern power will help you pull out of the sag of red figures. ● Get rid of your old power and put modern money-makers to work.

LIMA



OHIO

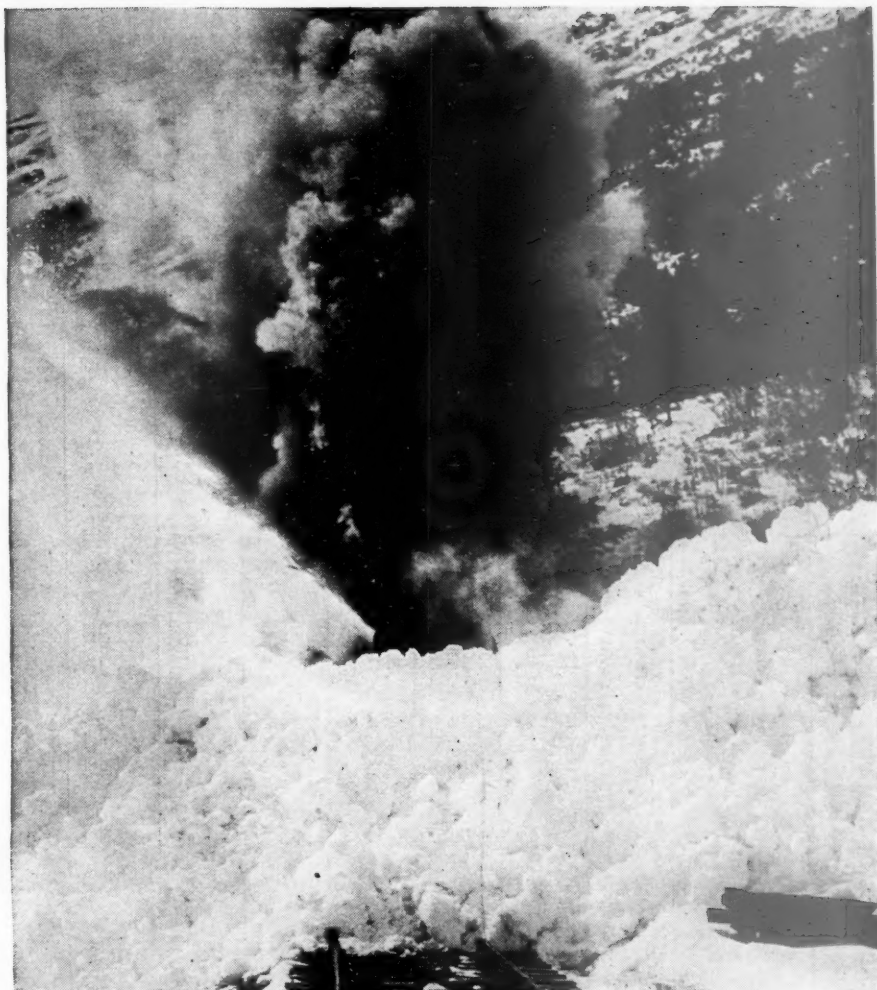
Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1933

Name of road	Av. mileage operated during period	Operating revenues				Operating expenses				Operating ratio	Net from railway operation	Operating income	Net railway operating income	Net operating income, 1932
		Freight	Passenger	Total (inc. misc.)	Way and structures	Equipment	Traffic	Trans- portation	General	Total				
Akron, Canton & Youngstown.....Oct.	171	\$123,835	\$61	\$123,896	\$17,391	\$18,826	\$7,118	\$42,272	\$7,418	\$91,363	68.6	\$41,744	\$33,234	\$21,455
Alton.....Oct.	171	1,283,709	222	1,283,931	167,842	147,960	76,495	387,107	85,379	857,988	63.2	498,660	394,535	273,705
Alton.....Oct.	975	921,056	177,040	1,098,096	129,778	134,900	44,807	429,978	39,442	469,420	63.2	461,490	363,367	254,640
Alton.....Oct.	978	8,243,926	1,658,684	9,902,610	1,308,990	1,298,941	462,049	4,185,675	411,089	7,778,631	68.9	3,513,513	2,685,372	1,418,336
Alton & Southern.....Oct.	31	.....	.....	96,803	9,104	7,485	5,559	27,790	4,082	54,060	55.85	42,743	1,312	—2,806
Alton & Southern.....Oct.	31	8,056,677	943,440	8,999,117	69,993	66,034	51,759	270,223	40,628	498,637	57.83	363,673	275,343	231,037
Atchison, Topeka & Santa Fe.....Oct.	9,711	.....	.....	9,776,054	1,103,590	2,119,916	297,183	2,968,725	361,099	6,845,657	70.0	2,930,397	2,086,713	2,241,594
Atchison, Topeka & Santa Fe.....Oct.	9,725	65,272,713	9,789,805	75,062,518	10,602,677	19,308,417	3,031,562	28,623,854	3,673,027	64,611,213	78.7	17,525,885	8,991,180	10,021,001
Gulf, Colorado & Santa Fe.....Oct.	1,927	1,204,506	46,530	1,251,036	219,841	241,250	48,402	396,959	61,308	967,698	73.0	357,409	274,579	192,575
Gulf, Colorado & Santa Fe.....Oct.	1,952	9,306,238	431,527	9,737,765	1,735,515	2,394,763	490,005	3,768,525	637,508	9,013,711	86.5	1,406,024	548,626	343,104
Panhandle & Santa Fe.....Oct.	1,878	844,567	25,495	870,062	70,611	171,816	177,836	230,170	28,113	518,281	56.4	401,468	351,800	153,582
Panhandle & Santa Fe.....Oct.	1,878	6,288,291	234,474	6,522,765	923,622	1,427,949	177,987	2,013,933	307,826	4,853,294	69.4	2,141,199	1,709,067	979,924
Atlanta & West Point.....Oct.	93	81,609	14,420	96,029	22,547	23,221	6,692	47,444	6,854	108,894	95.6	5,032	—1,899	—15,644
Atlanta & West Point.....Oct.	93	777,231	140,218	917,449	198,307	230,025	67,574	465,701	66,904	1,048,225	97.9	22,812	—49,805	—184,930
Western of Alabama.....Oct.	133	81,531	15,440	96,971	29,414	28,443	6,540	43,252	6,540	116,162	106.5	—7,068	—20,407	—15,693
Western of Alabama.....Oct.	133	775,204	149,084	924,288	220,428	284,354	67,654	408,654	66,131	1,063,196	103.0	—30,633	—116,718	—80,659
Atlanta, Birmingham & Coast.....Oct.	639	177,981	5,643	183,624	40,733	52,994	18,033	88,294	13,206	225,926	106.5	—13,860	—25,057	—32,704
Atlanta, Birmingham & Coast.....Oct.	639	1,856,157	44,379	1,900,536	387,032	443,053	190,390	889,092	147,411	2,159,336	99.2	17,068	—118,070	—215,185
Atlantic Coast Line.....Oct.	5,144	2,115,034	233,084	2,348,118	333,957	716,862	101,018	1,107,155	123,141	2,394,898	90.0	267,567	137,006	145,423
Atlantic Coast Line.....Oct.	5,144	24,856,619	3,597,812	28,454,431	3,941,772	6,357,527	1,072,704	11,412,975	1,264,338	24,254,338	76.4	7,493,889	4,107,559	3,354,398
Charleston & Western Carolina.....Oct.	342	138,743	2,058	140,801	23,790	5,252	5,252	50,826	5,369	108,145	74.3	37,400	17,875	20,032
Charleston & Western Carolina.....Oct.	342	1,536,516	12,254	1,548,770	223,291	212,613	55,421	503,805	48,772	1,043,902	65.6	546,913	371,112	368,760
Baltimore & Ohio.....Oct.	6,403	11,123,773	1,000,375	12,124,148	1,182,963	2,651,983	389,063	5,729,927	572,952	9,367,927	69.1	4,006,162	3,348,424	3,003,893
Baltimore & Ohio.....Oct.	6,403	95,265,865	8,202,176	103,468,041	8,968,603	19,388,301	3,366,886	35,992,832	5,453,552	74,078,389	67.0	36,488,605	29,507,210	25,683,392
Baltimore & Ohio Chic. Term.....Oct.	84	.....	.....	273,750	19,964	55,884	1,365	146,495	11,849	241,798	88.3	31,952	—9,766	63,204
Baltimore & Ohio Chic. Term.....Oct.	84	52,449	82,591	135,040	186,184	398,282	14,431	1,350,564	122,503	2,124,013	81.8	471,541	88,308	912,082
Staten Island Rapid Transit.....Oct.	23	504,172	849,305	1,353,477	77,913	127,038	16,564	755,993	122,296	1,099,804	77.0	329,422	187,297	30,372
Bangor & Aroostook.....Oct.	603	488,069	9,574	497,643	65,274	83,332	4,852	102,257	22,507	278,214	53.9	237,929	181,420	195,534
Bangor & Aroostook.....Oct.	612	4,462,041	157,949	4,620,000	804,388	829,031	43,453	1,048,608	230,965	2,963,245	61.6	1,847,968	1,396,002	1,401,487
Belt Ry. Co. of Chicago.....Oct.	54	.....	.....	383,361	29,051	33,569	2,467	153,093	8,352	226,532	59.1	156,899	110,361	148,093
Belt Ry. Co. of Chicago.....Oct.	54	.....	.....	3,371,659	232,337	307,706	24,600	1,441,852	88,951	2,095,446	62.1	1,276,213	842,690	1,398,006
Bessemer & Lake Erie.....Oct.	225	694,892	684	695,576	116,293	277,212	12,936	149,122	34,822	590,237	83.7	115,348	95,634	88,944
Bessemer & Lake Erie.....Oct.	225	5,759,814	7,396	5,767,210	583,958	1,821,145	104,928	1,137,634	324,254	3,971,459	67.8	1,886,162	1,667,759	1,690,953
Boston & Maine.....Oct.	2,081	2,694,313	458,596	3,152,909	443,844	624,373	51,270	1,402,406	169,257	2,700,184	73.3	983,751	788,638	600,391
Boston & Maine.....Oct.	2,081	24,386,677	5,484,154	29,870,831	4,153,341	5,358,857	587,348	13,312,632	1,685,251	25,171,567	71.8	9,900,413	7,683,129	6,193,019
Brooklyn Eastern Dist. Term.....Oct.	11	81,020	.....	81,020	5,180	10,020	257	24,411	5,412	45,280	54.5	37,810	31,814	31,814
Brooklyn Eastern Dist. Term.....Oct.	11	776,289	.....	776,289	49,306	88,669	2,723	230,625	60,810	432,133	54.7	357,916	296,617	297,257
Burlington & Rock Island.....Oct.	280	143,221	1,104	144,325	10,632	22,660	3,072	44,309	7,429	88,084	58.9	61,434	56,446	48,105
Burlington & Rock Island.....Oct.	280	714,752	10,715	725,467	99,883	98,128	30,649	358,461	71,044	657,800	85.9	108,122	59,886	—41,798
Cambria & Indiana.....Oct.	37	87,144	.....	87,144	10,018	34,298	389	10,997	7,393	63,095	72.22	24,270	10,765	68,690
Cambria & Indiana.....Oct.	37	993,777	.....	993,777	88,409	388,978	3,785	117,959	78,286	677,417	68.03	318,365	161,213	780,133
Canadian Pacific Lines in Maine.....Oct.	233	89,566	11,053	100,619	25,983	18,752	4,016	43,007	3,983	95,736	86.7	14,616	9,616	—3,632
Canadian Pacific Lines in Maine.....Oct.	233	1,060,551	147,445	1,207,996	282,079	250,183	42,605	537,711	37,271	1,149,844	87.9	157,551	88,540	—100,920
Canadian Pacific Lines in Vermont.....Oct.	85	54,615	7,894	62,509	17,907	16,170	1,763	49,594	2,497	87,931	117.2	—12,918	—17,118	—33,336
Canadian Pacific Lines in Vermont.....Oct.	85	504,163	108,025	612,188	165,040	168,171	19,170	492,276	25,102	869,849	114.8	—112,918	—166,194	—33,764
Central of Georgia.....Oct.	1,944	848,606	80,555	929,161	109,568	255,611	47,427	413,816	68,579	895,740	87.0	133,736	88,010	61,481
Central of Georgia.....Oct.	1,944	8,340,533	833,389	9,173,922	1,216,654	2,178,604	478,731	4,046,478	673,752	8,627,551	84.2	1,614,731	878,195	600,733
Central New Jersey.....Oct.	691	1,918,561	356,856	2,275,417	138,982	436,083	40,250	928,898	91,645	1,645,163	67.5	791,846	182,350	80,718
Central New Jersey.....Oct.	691	17,546,709	3,743,404	21,290,113	1,559,431	4,137,292	420,392	9,142,951	914,295	16,241,765	71.2	6,561,253	2,860,220	2,105,904
Central Vermont.....Oct.	457	361,403	28,572	389,975	57,585	90,814	12,588	191,500	21,131	373,530	86.2	60,004	43,766	16,428
Central Vermont.....Oct.	457	3,396,196	364,031	3,760,227	697,839	915,251	139,558	1,821,928	200,443	3,675,443	87.6	521,400	363,604	158,890
Chesapeake & Ohio.....Oct.	3,131	9,349,990	233,794	9,583,784	829,976	1,675,711	169,024	2,098,603	279,598	5,064,094	50.8	4,907,239	3,851,928	3,790,103
Chesapeake & Ohio.....Oct.	3,147	84,093,846	2,102,277	86,196,123	9,679,147	15,594,422	1,635,918	27,788,711	49,044,295	31,780,707	54.8	40,455,766	31,780,707	26,855,132
Chicago & Eastern Illinois.....Oct.	938	902,831	140,176	1,043,007	136,337	163,552	48,970	439,846	57,700	852,886	73.6	306,132	230,987	100,154
Chicago & Eastern Illinois.....Oct.	938	8,004,743	1,113,021	9,117,764	1,256,957	1,429,904	490,326	4,200,262	540,713	7,983,142	78.9	2,138,393	1,334,855	96,458

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BUCKING SNOW



with *The Locomotive* BOOSTER

Where service is severe, calling for supreme efforts from men and locomotive, you will find the Booster sturdily adding its power to that of the main locomotive.

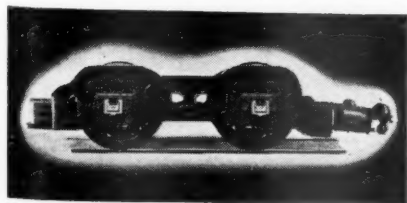
On the Alaska Railroad, "snow-bucking" is a routine job that is speeded by using the extra power of The Locomotive Booster.

Whether bucking snow in the far North or starting de Luxe trains the country over, Booster power speeds operation, reduces cost and increases the popularity of your operation.

Today, the Booster has become a

fundamental element that is built into locomotive design, thus reducing weight and first cost. Its earning capacity has been established in all branches of railroad service.

Because it soon pays for itself, the Booster should be included on every modern locomotive. It also brings the old ones into new usefulness and profitable operation. You have many locomotives that were built with trucks, etc., for future application of the Booster. There is no better time than the present for starting that program.



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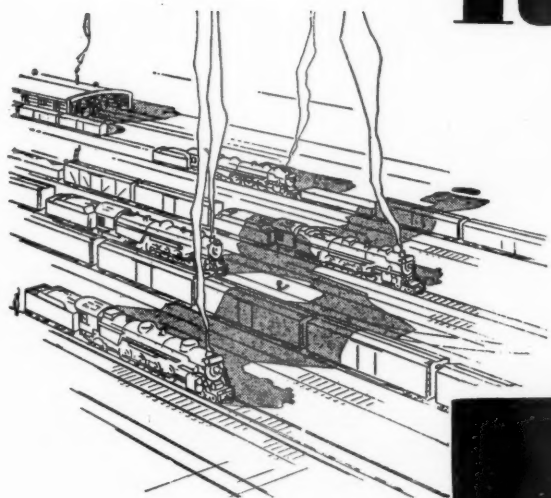
Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1933—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues				Operating expenses				Operating ratio	Net from railway operation	Operating income	Net railway operating income, 1932
		Freight	Passenger	Total	Maintenance of way and structures	Traffic	Trans- portation	General	Total				
Chicago & Illinois Midland.....	131	\$268,116	\$1,068	\$276,327	\$30,392	\$15,313	\$64,544	\$18,027	\$169,102	61.2	\$107,225	\$86,758	\$31,000
Chicago & North Western.....	131	2,411,004	10,053	2,495,166	266,681	154,154	591,366	154,201	1,611,842	64.6	883,324	750,389	106,019
Chicago & North Western.....	10 mos.	8,442	5,685,537	882,227	7,332,034	1,232,146	1,600,823	2,584,722	5,169,072	70.5	2,162,962	1,586,245	1,014,051
Chicago & North Western.....	10 mos.	8,442	7,732,656	62,308,536	8,238,489	1,565,594	23,498,179	2,649,198	48,617,370	78.0	13,691,166	7,843,941	1,208,794
Chicago, Burlington & Quincy.....	9,247	6,914,510	687,404	8,334,042	1,063,483	199,048	2,571,429	286,743	5,261,153	63.1	3,072,889	2,469,133	1,796,621
Chicago, Burlington & Quincy.....	10 mos.	52,454,242	5,708,114	65,048,687	6,903,704	2,039,369	22,631,602	2,836,409	44,757,253	68.8	20,295,434	13,812,579	8,304,126
Chicago, Burlington & Quincy.....	10 mos.	1,499	1,262,540	438,418	202,712	49,077	4,529,045	47,380	988,020	69.9	425,740	370,871	174,603
Chicago, Burlington & Quincy.....	10 mos.	1,499	10,983,620	458,418	1,650,091	1,664,822	4,529,045	47,380	3,399,703	72.2	3,399,703	2,776,616	861,259
Chicago, Indianapolis & Louisville.....	647	511,318	88,595	680,491	47,076	152,703	261,904	19,497	514,092	75.5	166,399	130,934	92,834
Chicago, Indianapolis & Louisville.....	10 mos.	4,773,661	526,861	6,034,782	1,347,000	225,954	2,487,978	216,511	4,848,159	80.3	1,186,623	829,097	248,081
Chicago, Indianapolis & Louisville.....	10 mos.	6,825,734	622,275	8,193,415	1,160,024	220,613	2,840,918	261,920	5,982,961	73.0	2,210,454	1,744,306	1,461,139
Chicago, Mil., St. Paul & Pacific.....	11,230	60,820,426	4,864,023	72,453,567	8,833,777	2,019,562	26,120,055	2,537,146	54,131,216	74.7	18,322,351	12,147,626	935,475
Chicago, Rock Island & Pacific.....	20	.....	422,013	18,000	23,000	1,528	122,403	10,377	175,308	41.5	246,705	213,196	273,204
Chicago, Rock Island & Pacific.....	10 mos.	.....	3,779,915	154,500	221,000	1,934	1,145,222	101,387	1,637,043	43.5	2,142,872	1,880,847	2,448,541
Chicago, Rock Island & Pacific.....	10 mos.	7,611	587,967	51,838,158	668,647	169,733	2,172,909	262,552	4,664,067	80.7	1,115,078	718,862	739,721
Chicago, Rock Island & Pacific.....	10 mos.	7,611	4,659,771	4,690,992	5,429,033	1,675,108	20,143,431	2,538,989	41,483,681	80.0	10,355,477	5,844,260	3,596,692
Chicago, Rock Island & Pacific.....	10 mos.	.....	57,498	47,715	18,669,828	15,255	115,146	17,777	256,483	73.3	93,595	73,128	6,625
Chicago, Rock Island & Pacific.....	10 mos.	.....	2,780,791	414,226	371,569	146,133	985,065	177,714	2,119,342	76.2	661,449	458,823	396,545
Chicago, Rock Island & Pacific.....	10 mos.	.....	1,342,913	136,000	191,754	316,976	5,248,957	65,898	982,880	73.7	2,908,711	2,102,636	1,930,086
Chicago, Rock Island & Pacific.....	10 mos.	.....	1,184,415	12,316,280	1,239,012	1,869,828	5,248,957	65,898	9,407,569	76.4	9,407,569	9,407,569	188,623
Chic., St. Paul, Minn. & Omaha.....	1,709	10,232,577	1,184,415	12,316,280	1,239,012	1,869,828	5,248,957	65,898	9,407,569	76.4	9,407,569	9,407,569	188,623
Cinn. Union Terminal.....	45	.....	5,448	8,544	4,925	.....	76,956	4,363	94,788	1,739.9	89,340	117,842	114,936
Cinn. Union Terminal.....	10 mos.	.....	36,838	61,277	103,887	15,160	74,886	41,096	695,464	1,882.5	176,647	855,044	847,327
Cinn. Union Terminal.....	10 mos.	.....	1,712	415,793	344,838	901,417	695,883	133,298	2,239,146	55.2	1,811,538	1,331,294	1,550,270
Clinchfield R. R.....	309	3,974,450	19,399	4,039,819	344,838	901,417	695,883	133,298	2,239,146	55.2	1,811,538	1,331,294	1,550,270
Colorado & Southern.....	1,029	583,411	16,934	649,668	67,555	11,076	202,354	31,196	410,607	63.2	239,061	190,048	155,577
Colorado & Southern.....	10 mos.	.....	212,249	4,325,655	531,002	114,550	1,640,155	316,665	3,527,695	89.1	797,960	247,555	172,156
Colorado & Southern.....	10 mos.	.....	36,369	654,175	41,118	70,266	155,075	30,764	314,194	48.0	339,981	305,556	245,644
Colorado & Southern.....	10 mos.	.....	282,393	4,489,070	303,970	600,918	152,270	316,320	2,757,948	61.4	1,731,122	1,428,792	1,158,942
Ft. Worth & Denver City.....	804	3,600,567	5,543	106,847	16,528	7,289	34,260	8,257	69,494	65.0	37,353	34,413	33,847
Ft. Worth & Denver City.....	10 mos.	.....	5,543	106,847	16,528	7,289	34,260	8,257	69,494	65.0	37,353	34,413	33,847
Ft. Worth & Denver City.....	10 mos.	.....	37,734	648,646	117,929	28,949	244,034	79,116	564,774	87.1	83,832	65,108	56,382
Ft. Worth & Denver City.....	10 mos.	.....	77,157	10,844	12,390	9,561	31,040	3,246	57,934	73.1	19,223	19,193	1,934
Ft. Worth & Denver City.....	10 mos.	.....	592,350	61,710	95,761	3,511	247,773	28,522	437,277	73.8	155,073	152,343	165,722
Delaware & Hudson.....	848	1,854,871	89,998	2,061,671	251,360	53,769	751,649	136,611	1,720,434	83.4	341,237	267,362	277,765
Delaware & Hudson.....	10 mos.	.....	935,982	18,327,780	2,713,541	493,636	502,315	1,355,092	16,880,840	92.1	1,446,940	637,820	672,084
Delaware & Hudson.....	10 mos.	.....	524,078	3,775,136	318,308	818,202	1,083,647	153,045	3,973,367	81.4	7,017,769	250,800	233,183
Delaware & Hudson.....	10 mos.	.....	53,555,548	36,084,439	3,239,424	7,226,749	1,081,471	1,509,348	28,752,474	79.7	7,331,965	3,136,029	2,847,750
Delaware, Lackawanna & Western.....	998	25,950,267	53,555,548	36,084,439	3,239,424	7,226,749	1,081,471	1,509,348	28,752,474	79.7	7,331,965	3,136,029	2,847,750
Denver & Rio Grande Western.....	2,471	1,928,904	87,556	2,100,187	194,299	304,366	594,623	71,185	1,211,333	57.7	888,854	723,530	937,509
Denver & Rio Grande Western.....	10 mos.	.....	762,535	13,876,268	1,460,820	2,918,717	4,348,937	714,872	9,910,030	71.4	3,966,238	2,531,099	2,478,860
Denver & Rio Grande Western.....	10 mos.	.....	2,580	208,403	21,551	1,609	33,433	12,365	94,529	45.4	113,874	100,874	143,783
Denver & Rio Grande Western.....	10 mos.	.....	41,060	1,372,024	187,127	229,307	253,062	114,627	758,544	55.3	613,480	478,178	587,644
Denver & Salt Lake.....	232	1,209,659	71,023	1,466	6,671	910	21,684	3,523	42,211	59.4	28,812	24,040	22,994
Denver & Salt Lake.....	10 mos.	.....	23,545	102,348	76,137	9,647	208,298	37,434	433,351	85.5	73,598	40,057	37,948
Denver & Salt Lake.....	10 mos.	.....	206,623	24,303	6,508	6,263	118,957	51.9	101,666	82.312	101,666	82,312	39,970
Denver & Salt Lake.....	10 mos.	.....	2,121,544	190,611	202,084	66,305	543,588	67,453	1,069,953	50.4	1,051,591	840,763	232,580
Detroit & Mackinac.....	242	62,621	1,466	71,023	6,671	910	21,684	3,523	42,211	59.4	28,812	24,040	22,994
Detroit & Mackinac.....	10 mos.	.....	23,545	102,348	76,137	9,647	208,298	37,434	433,351	85.5	73,598	40,057	37,948
Detroit & Mackinac.....	10 mos.	.....	206,623	24,303	6,508	6,263	118,957	51.9	101,666	82.312	101,666	82,312	39,970
Detroit & Mackinac.....	10 mos.	.....	2,121,544	190,611	202,084	66,305	543,588	67,453	1,069,953	50.4	1,051,591	840,763	232,580
Detroit & Toledo Shore Line.....	50	210,795	1,466	71,023	6,671	910	21,684	3,523	42,211	59.4	28,812	24,040	22,994
Detroit & Toledo Shore Line.....	10 mos.	.....	23,545	102,348	76,137	9,647	208,298	37,434	433,351	85.5	73,598	40,057	37,948
Detroit & Toledo Shore Line.....	10 mos.	.....	206,623	24,303	6,508	6,263	118,957	51.9	101,666	82.312	101,666	82,312	39,970
Detroit & Toledo Shore Line.....	10 mos.	.....	2,121,544	190,611	202,084	66,305	543,588	67,453	1,069,953	50.4	1,051,591	840,763	232,580
Detroit Terminal.....	19	.....	52,001	6,671	6,571	3	22,510	2,517	38,272	73.6	13,729	12,190	4,042
Detroit Terminal.....	10 mos.	.....	562,813	52,417	74,941	10	288,265	25,591	441,224	78.4	121,389	121,389	104,307
Detroit Terminal.....	10 mos.	.....	375,448	35,207	63,182	9,665	103,864	17,360	227,885	60.7	147,363	119,838	5,086
Detroit Terminal.....	10 mos.	.....	2,992	3,357,371	319,931	93,842	902,260	173,811	2,017,808	60.1	1,339,563	1,027,208	393,671
Duluth, Missabe & Northern.....	563	1,276,080	2,073	1,444,494	113,900	2,566	270,818	39,042	602,978	41.7	841,516	762,557	761,365
Duluth, Missabe & Northern.....	10 mos.	.....	21,499	9,539,738	965,241	28,815	1,822,657	397,349	4,607,817	48.3	4,301,921	4,287,158	4,287,158
Duluth, Missabe & Northern.....	10 mos.	.....	2,817	82,370	16,000	2,219	35,401	4,890	76,083	92.4	6,287	1,753	12,219
Duluth, Missabe & Northern.....	10 mos.	.....	20,241	683,049	180,414	22,963	331,098	44,932	750,372	109.9	—	—	—
Duluth, Winnipeg & Pacific.....	178	633,532	931,118	94,734	94,734	12,170	348,073	42,862	737,014	79.2	194,104	88,367	49,183
Duluth, Winnipeg & Pacific.....	10 mos.	.....	8,483,367	818,338	1,848,845	116,026	2,087,596	240,664	6,257,323	73.8	2,226,044	1,169,171	902,785
Duluth, Winnipeg & Pacific.....	10 mos.	.....	5,929,591	509,915	1,238,464	144,534	2,087,596	240,664	4,225,899	72.5	1,603,692	1,260,993	1,111,514
Duluth, Winnipeg & Pacific.....	10 mos.	.....	4,311,742	53,130,639	4,882,929	11,277,573	1,319,677	2,339,009	38,835,863	73.1	14,234,776	10,865,986	9,757,516
Egin, Joliet & Eastern.....	2,046	44,589,080	419,626	45,008,706	5,929,591	509,915	1,238,464	240,664	4,225,899	72.5	1,603,692	1,260,993	1,111,514
Erie.....	2,046	44,589,080	419,626	45,008,706	5,929,591	509,915	1,238,464	240,664	4,225,899	72.5	1,603,692	1,260,993	1,111,514

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A RAILROAD VETERAN



WITH a quarter-century of railroad service to its credit, American Arch Company has earned the title of veteran.

This experience has a practical value. It gives assurance of an Arch Brick supply that conforms with each railroad's conditions.

Every conceivable kind of locomotive combustion condition has been studied by American Arch Company during its 25 years of

supplying Arch Brick. The kind of brick and the design of brick to meet every condition of service are thoroughly understood and by cooperating with the country's leading refractories manufacturers the best of material is assured.

American Arch Company service has been thoroughly seasoned by years of railroading. It is dependable.

**HARBISON-WALKER
REFRACTORIES CO.**

Refractory Specialists



**AMERICAN ARCH CO.
INCORPORATED**

*Locomotive Combustion
Specialists* * * *

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1933—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues				Operating expenses				Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income	Net operating income, 1932
		Freight	Passenger	Inc. misc.	Total	Way and structures	Traffic	Trans- portation	General						
Chicago & Erie.....Oct.	269	\$725,295	\$49,448	\$846,365	\$1,282,822	\$87,156	\$23,809	\$218,746	\$34,250	\$462,585	54.7	\$383,780	\$34,250	\$99,372	\$219,957
Chicago & Erie.....10 mos.	269	6,731,098	287,389	7,518,996	12,136,244	787,341	224,535	1,939,643	325,943	4,198,473	55.8	3,320,523	325,943	870,546	103,546
New Jersey & New York.....Oct.	45	18,735	57,123	75,858	150,716	10,907	23,538	15,631	5,371	92,982	118.8	4,690	5,371	37,097	18,406
New Jersey & New York.....10 mos.	45	164,420	608,628	794,058	1,567,046	82,116	13,905	469,518	36,495	841,323	106.0	47,265	36,495	278,545	202,984
N. Y., Susquehanna & Western.....Oct.	131	223,238	25,311	265,021	30,408	53,032	4,810	103,959	11,370	203,576	76.8	61,445	11,370	18,765	89,350
N. Y., Susquehanna & Western.....10 mos.	131	2,260,492	268,282	2,666,866	2,666,866	505,449	43,243	1,039,741	108,234	1,974,778	74.0	692,108	108,234	258,435	356,435
Florida East Coast.....Oct.	839	211,093	61,784	322,244	106,231	134,627	20,671	136,386	53,027	450,022	139.7	127,778	53,027	220,388	133,399
Florida East Coast.....10 mos.	839	3,669,249	1,213,665	5,440,495	1,043,798	1,282,964	193,981	1,592,494	400,333	4,352,496	82.2	987,999	400,333	136,495	339,095
Fort Smith & Western.....Oct.	249	80,796	1,079	85,469	13,620	11,467	4,577	21,581	4,757	56,150	65.7	29,319	4,757	20,008	23,393
Fort Smith & Western.....10 mos.	249	497,246	9,704	544,532	93,116	43,685	182,734	182,734	40,687	489,207	89.8	55,325	40,687	11,491	60,115
Galveston Wharf.....Oct.	11	.....	.....	.....	27,339	3,071	3,439	21,922	4,362	63,417	50.1	63,197	4,362	44,881	23,627
Galveston Wharf.....10 mos.	11	.....	.....	.....	292,509	33,227	32,019	201,451	52,361	649,187	70.3	274,287	52,361	81,972	230,868
Georgia R. R.....Oct.	329	226,033	13,534	258,862	33,286	55,363	16,222	105,709	11,975	222,921	86.1	35,941	11,975	39,787	58,983
Georgia R. R.....10 mos.	329	2,220,951	130,196	2,536,484	287,215	468,224	161,457	1,069,368	122,433	2,111,018	83.2	425,466	122,433	469,285	229,931
Georgia & Florida.....Oct.	465	68,476	2,130	75,376	18,699	17,977	7,530	31,063	5,423	80,480	106.8	5,104	5,423	8,741	14,092
Georgia & Florida.....10 mos.	464	766,141	14,944	826,926	168,442	149,639	78,879	316,421	60,015	774,410	93.6	52,516	60,015	3,679	181,118
Grand Trunk Western.....Oct.	1,008	1,039,483	91,344	1,250,344	217,931	290,576	34,237	574,059	75,686	1,196,853	90.7	53,491	75,686	109,365	65,587
Grand Trunk Western.....10 mos.	1,005	11,179,010	600,807	12,700,860	2,093,959	2,833,520	354,199	5,509,535	769,583	11,590,291	91.3	1,110,568	769,583	690,370	1,776,394
Canadian Nat'l Lines in New Eng.....Oct.	172	78,373	93,208	29,123	29,123	16,222	2,860	58,311	10,646	122,406	131.3	29,198	10,646	76,655	27,967
Canadian Nat'l Lines in New Eng.....10 mos.	172	721,332	74,239	894,027	215,472	176,387	30,118	522,593	87,599	1,044,091	116.8	150,064	87,599	646,570	763,072
Great Northern.....Oct.	8,452	6,449,225	351,263	7,294,850	656,696	985,255	149,256	2,026,808	238,823	4,124,758	56.5	3,170,092	2,026,808	2,259,632	2,153,500
Great Northern.....10 mos.	8,453	44,677,590	52,377,079	4,642,804	9,220,869	1,549,327	1,549,327	16,816,267	2,010,719	34,656,572	66.2	17,720,507	11,869,521	10,148,900	10,106,000
Green Bay & Western.....Oct.	234	94,033	797	99,054	24,916	16,222	4,384	35,577	2,511	83,563	84.3	15,491	2,511	12,357	8,268
Green Bay & Western.....10 mos.	234	883,667	9,187	927,676	203,847	136,259	43,977	384,534	25,424	793,726	85.5	133,950	25,424	63,541	31,094
Gulf & Ship Island.....Oct.	307	82,529	3,548	95,985	14,800	22,935	1,849	42,023	5,401	87,008	90.6	8,977	5,401	7,855	11,652
Gulf & Ship Island.....10 mos.	307	826,339	53,603	898,823	125,195	165,608	19,699	404,391	41,899	758,119	84.3	140,704	41,899	139,672	226,868
Gulf, Mobile & Northern.....Oct.	963	409,667	20,067	448,853	52,376	69,549	31,110	132,883	22,452	208,370	68.70	140,483	22,452	64,879	63,821
Gulf, Mobile & Northern.....10 mos.	823	3,120,931	114,943	3,392,967	383,635	485,971	234,562	1,007,062	173,313	2,284,543	67.33	1,108,424	173,313	567,804	521,176
Illinois Central.....Oct.	5,014	5,877,610	905,438	7,302,105	772,016	1,412,203	131,981	2,441,494	318,829	5,112,635	70.0	2,189,470	318,829	1,602,251	2,111,737
Illinois Central.....10 mos.	5,014	50,801,033	7,156,577	63,253,966	5,179,744	12,706,830	1,466,140	22,511,083	2,945,900	45,123,199	71.3	18,128,817	2,945,900	12,287,208	10,172,215
Yazoo & Mississippi.....Oct.	1,658	1,189,871	58,720	1,325,337	127,025	163,466	19,033	437,675	46,788	794,073	57.4	531,264	46,788	303,263	118,461
Yazoo & Mississippi.....10 mos.	1,658	8,495,233	523,974	9,028,899	760,956	1,371,001	198,234	3,788,566	424,885	6,543,034	69.9	3,159,865	424,885	939,902	106,587
Illinois Central System.....Oct.	6,673	7,067,481	964,158	8,627,442	899,041	1,575,669	151,014	2,879,169	365,117	5,906,708	68.5	2,720,734	365,117	1,905,514	2,230,198
Illinois Central System.....10 mos.	6,673	59,296,266	7,956,865	5,940,700	14,077,831	1,664,374	26,299,649	3,370,845	51,668,183	15,672,515	70.8	21,288,682	51,668,183	13,227,110	10,278,802
Illinois Terminal.....Oct.	537	354,386	50,952	421,030	60,018	53,339	13,722	145,943	15,888	284,482	67.57	136,548	15,888	75,470	91,417
Illinois Terminal.....10 mos.	540	3,352,399	478,775	3,967,982	488,979	485,654	141,248	1,394,911	164,862	2,668,485	67.25	1,299,497	164,862	734,287	503,864
Kansas City Southern.....Oct.	783	627,216	20,498	733,934	77,314	145,292	41,277	226,598	59,417	549,260	74.8	184,674	59,417	96,783	211,342
Kansas City Southern.....10 mos.	783	6,087,275	148,066	7,087,583	707,583	1,273,143	396,492	2,168,548	596,921	5,148,919	72.4	1,961,703	596,921	1,001,786	815,203
Texasarkana & Ft. Smith.....Oct.	98	83,801	1,511	99,969	9,106	7,453	5,518	25,851	9,054	57,296	57.3	42,673	9,054	16,071	9,922
Texasarkana & Ft. Smith.....10 mos.	98	694,857	11,379	836,553	85,713	77,142	55,365	247,837	82,577	555,140	66.4	281,413	82,577	27,604	17,249
Kansas, Oklahoma & Gulf.....Oct.	326	179,826	391	183,034	28,537	14,204	7,012	39,067	7,989	92,148	50.3	90,886	7,989	55,654	73,579
Kansas, Oklahoma & Gulf.....10 mos.	326	1,483,731	3,018	1,513,168	183,672	110,970	67,870	344,982	76,429	777,831	51.4	735,337	76,429	418,248	337,041
Lake Superior & Ishpeming.....Oct.	160	298,111	86	349,976	19,825	19,825	713	50,101	5,685	113,819	32.5	236,157	190,858	190,195	24,745
Lake Superior & Ishpeming.....10 mos.	160	1,485,764	753	1,710,930	219,356	140,938	5,376	50,101	5,685	702,750	41.1	1,008,180	769,217	759,162	285,171
Lake Terminal.....Oct.	12	.....	.....	48,377	4,720	6,066	.....	20,484	2,760	34,030	70.3	14,347	2,760	10,442	17,087
Lake Terminal.....10 mos.	12	.....	.....	553,554	43,747	51,791	.....	205,265	25,946	326,749	59.0	226,805	25,946	193,445	66,140
Lehigh & Hudson River.....Oct.	96	113,538	193	120,390	17,786	16,947	3,087	40,812	6,170	84,802	70.4	35,588	6,170	12,408	28,571
Lehigh & Hudson River.....10 mos.	96	1,138,243	2,650	1,209,228	125,724	189,948	32,367	397,513	63,254	808,796	66.9	400,432	63,254	162,713	113,702
Lehigh & New England.....Oct.	228	256,828	451	259,717	32,069	54,765	4,884	93,649	15,405	200,772	77.3	58,945	15,405	47,103	102,949
Lehigh & New England.....10 mos.	228	2,495,439	4,286	2,524,459	301,101	521,339	48,386	886,709	155,423	1,913,129	75.8	609,330	155,423	503,278	642,116
Lehigh Valley.....Oct.	1,354	3,136,601	192,987	3,596,836	201,798	383,024	105,571	1,423,034	122,745	2,715,171	75.5	881,665	122,745	593,742	934,742
Lehigh Valley.....10 mos.	1,359	27,382,635	31,808,809	2,545,578	6,670,016	1,059,431	1,059,431	13,316,085	1,216,759	24,971,357	78.5	6,837,452	1,216,759	3,532,586	2,339,363
Louisiana & Arkansas.....Oct.	608	329,088	12,291	362,994	55,019	74,761	22,270	90,296	19,051	261,061	71.9	101,933	19,051	67,610	115,375
Louisiana & Arkansas.....10 mos.	608	3,130,291	88,065	3,451,315	469,460	590,663	199,592	911,392	171,432	2,240,597	64.9	1,210,718	171,432	786,792	654,429
Louisiana, Arkansas & Texas.....Oct.	255	73,711	166	80,750	18,363	7,982	4,837	23,392	4,591	61,154	75.7	19,596	4,591	1,355	18,064
Louisiana, Arkansas & Texas.....10 mos.	255	631,450	2,786	696,387	78,727	78,727	37,434	240,937	46,602	574,865	82.6	121,522	46,602	97,759	27,094

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AMERICAN LOCOMOTIVE COMPANY

WE are hearing a great deal of late about speed and what it is going to do for our railroads.

Any old timer in the game, and not so very old at that, would probably say, "Well, certainly, times do change." For it isn't so long ago when if one mentioned much about speed, he would get hushed from every corner.

Almost every engineer can tell you of some occasion when he just opened up everything wide and did some real speeding—but, of course, it was off the record.

But some of these speeds are on the record. Almost all mechanical men know of one large system in particular where a modern steam locomotive with 6 to 7 Pullmans, over a section of its run, day-in and day-out, exceeded 100 miles per hour.

And there is another large system that has a modern steam locomotive that on level stretches can continuously do 90

miles per hour with 12 to 14 of our present Pullmans.

And looking back, we find that on the Philadelphia & Reading Railway, an Atlantic type locomotive on its run from Camden to Atlantic City, a distance of 55.5 miles, from August 5th to August 31st, 1898, running every week day, the **average** speed never fell below 70.5 m. p. h., and on August 5th, 1898, the **average** speed was 74.4 m. p. h.

And we could continue ad libitum.

Now the point is this—true, speeds of late, for reasons best known to the railroads themselves, have been kept within certain limits, but it is not because of any inability of the steam locomotive.

The steam locomotive can make, and in fact has made, any of the speeds that we are being told will revolutionize railroading today.

30 CHURCH STREET NEW YORK N.Y.

We are prepared to submit streamlined designs, steam or diesel powered as desired, to meet any or every demand of our railroads.

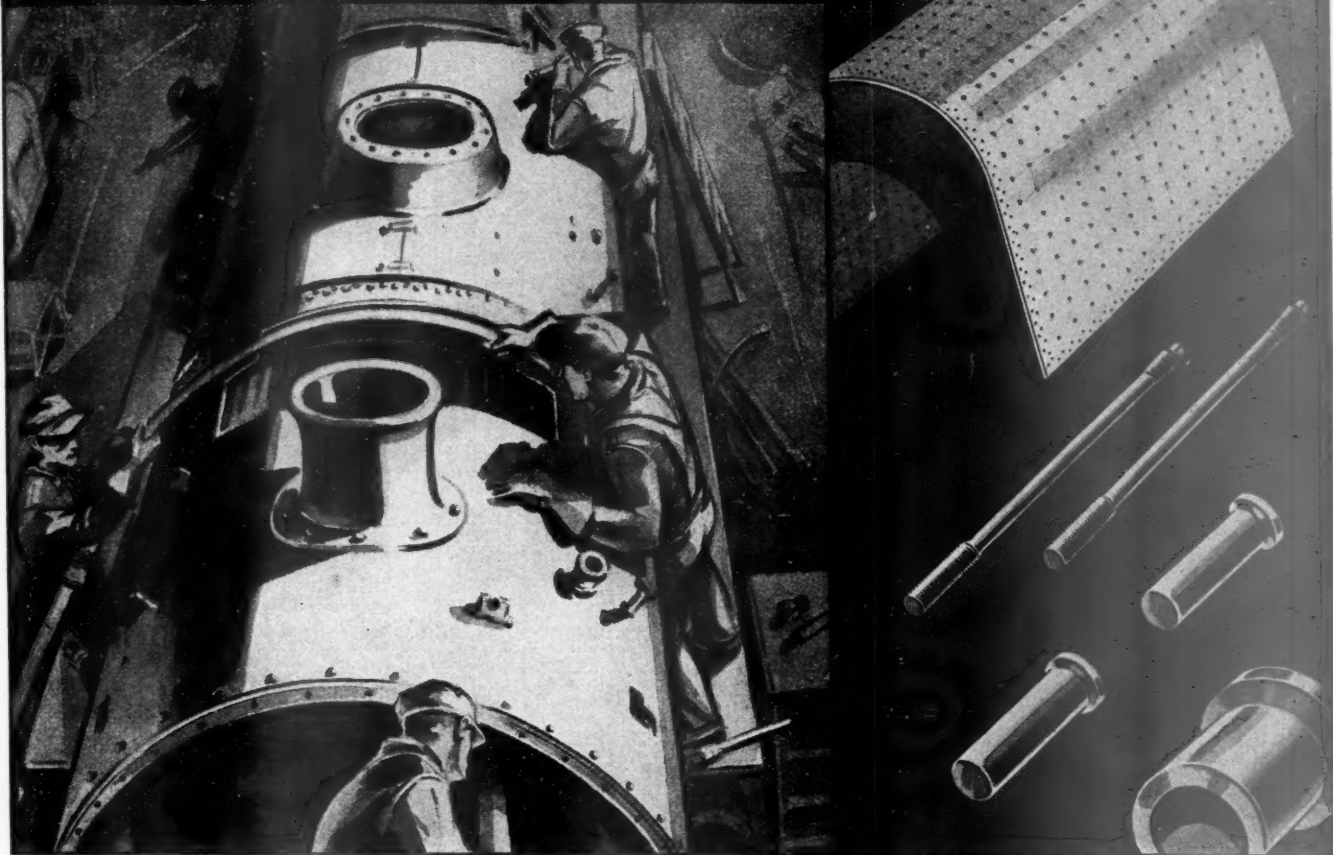
Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1933—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues				Maintenance of—				Operating expenses				Operating ratio	Net from operation	Net railway operating income, 1932	Net 17. operating income, 1932
		Freight	Passenger	Total (inc. misc.)	Way and structures	Equipment	Traffic	Transportation	General	Total	Operating ratio	Net from operation	Net railway operating income, 1932				
Louisville & Nashville.....	5,116	\$5,233,947	\$411,941	\$5,645,888	\$673,400	\$1,472,586	\$176,687	\$2,116,540	\$261,441	\$4,732,674	78.3	\$1,311,708	\$1,061,151	\$1,625,818			
Maine Central.....	5,141	47,288,377	3,705,265	51,000,000	6,046,967	11,976,324	1,659,424	19,234,329	2,592,412	41,815,212	76.0	13,237,222	9,572,705	9,943,847	4,998,756		
Midland Valley.....	1,046	7,157,661	756,910	7,914,571	1,262,709	1,400,646	103,423	3,150,530	375,306	6,291,481	71.3	2,531,178	2,062,907	1,686,488	1,278,689		
Minneapolis & St. Louis.....	1,627	5,919,454	142,076	6,061,530	809,201	1,282,903	246,327	2,958,108	337,465	5,629,453	87.3	821,416	473,223	249,046	345,917		
Minn., St. Paul & S. S. Marie.....	4,304	1,863,346	93,379	1,956,725	251,420	3,466,312	608,644	7,266,153	1,103,966	15,000,844	80.0	545,921	412,600	258,820	267,424		
Duluth, South Shore & Atlantic.....	563	1,377,038	8,345	1,385,383	33,094	35,056	52,298	658,292	57,980	1,372,095	84.2	257,646	72,294	32,988	461,151		
Spokane International.....	163	319,436	14,894	334,330	106,505	45,518	19,980	180,158	41,322	403,391	108.1	30,079	2,637	2,637	48	3,113	
Mississippi Central.....	150	478,819	13,454	492,273	88,816	107,974	60,795	135,779	50,852	464,219	90.9	46,683	18,142	16,031	51,478		
Missouri & North Arkansas.....	364	81,954	1,159	83,113	11,696	9,888	2,048	20,094	3,940	35,504	87.3	28,150	26,058	15,487	6,316		
Missouri-Illinois.....	202	660,744	10,451	671,195	138,444	94,413	45,848	255,857	46,413	580,565	79.3	151,883	128,360	41,552	97,651		
Missouri-Kansas-Texas Lines.....	3,293	2,323,799	152,243	2,476,042	261,605	348,298	142,869	813,195	144,252	1,724,375	63.5	989,131	933,682	746,502	783,507		
Missouri Pacific.....	7,411	49,053,328	3,126,816	52,180,144	8,709,934	13,211,549	2,063,396	22,046,619	2,526,379	43,530,017	76.2	13,627,413	10,130,135	6,383,075	7,405,091		
Gulf Coast Lines.....	1,159	820,875	51,444	872,319	129,116	170,013	24,332	356,772	42,493	729,757	75.28	239,624	213,834	108,531	140,548		
International-Great Northern.....	1,159	9,205,384	515,715	9,721,099	1,330,962	1,783,170	255,649	3,609,782	433,561	7,489,966	71.06	3,049,753	2,685,469	1,438,675	391,402		
San Antonio, Uvalde & Gulf.....	316	54,975	2,639	57,614	18,328	8,310	3,784	15,724	4,157	50,295	78.7	13,613	10,702	6,606	26,241		
Mobile & Ohio.....	1,201	711,442	24,775	736,217	93,143	218,670	39,013	270,954	37,087	609,274	80.7	120,627	82,891	113,950	22,190		
Monongahela.....	1,218	6,233,503	208,653	6,442,156	846,926	1,540,421	383,690	2,495,137	363,986	5,631,836	82.5	1,191,092	781,901	155,293	505,619		
Monongahela Connecting.....	177	298,472	644	300,862	36,864	25,164	400	59,523	3,596	125,571	41.7	175,291	147,453	72,089	137,102		
Montour.....	57	105,941	.....	105,941	12,478	58,796	1,022	24,484	5,295	102,075	95.7	47,129	43,628	11,604	110,531		
Nashville, Chattanooga & St. Louis.....	1,203	902,383	71,004	973,387	1,083,317	298,794	50,814	409,342	53,072	895,674	65.5	471,629	354,778	619,286	549,840		
Nevada Northern.....	165	182,420	10,855	193,275	86,808	38,445	7,146	69,896	31,313	231,161	101.0	2,270	69,784	29,874	1,817		
Newburgh & South Shore.....	6	.....	.....	.....	26,772	164,685	.....	186,787	44,189	424,433	116.6	60,027	147,283	108,904	149,298		
New Orleans Terminal.....	20	.....	.....	.....	100,802	9,463	6,924	27,127	970	44,484	44.1	56,318	44,415	44,180	70,668		
New York Central.....	11,429	17,910,773	4,989,292	22,900,065	2,783,317	5,437,596	526,416	9,168,443	1,017,169	19,341,138	39.2	6,034,106	4,889,359	3,436,382	413,708		
Indiana Harbor Belt.....	120	.....	.....	.....	768,817	34,000	32,009	2,510,077	175,509	3,787,158	58.7	2,667,808	2,162,028	1,628,548	1,259,389		
Pittsburgh & Lake Erie.....	231	1,178,198	45,755	1,223,953	1,269,537	125,303	431,550	426,469	64,691	1,991,601	86.0	177,936	89,323	218,351	196,092		
New York, Chicago & St. Louis.....	1,690	2,546,831	111,989	2,658,820	38,000	82,000	3,418	289,373	17,982	440,807	57.3	328,010	264,291	222,702	213,487		
N. Y., New Haven & Hartford.....	2,068	32,371,622	16,754,427	49,126,049	5,550,090	9,282,238	725,097	20,774,593	2,255,241	40,685,387	73.0	15,060,439	11,267,493	6,422,819	9,524,281		

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WHAT REPUBLIC CAN CONTRIBUTE TO YOUR NEW LOCOMOTIVES



Modern materials developed by Republic metallurgists afford the opportunity of reducing weight and improving efficiency in your new locomotives. » » » Firebox material must function under extremely high pressures. Toncan Iron firebox sheets resist corrosion and fire-cracking. » » » Higher boiler pressures have increased staybolt stresses. Alloy staybolts are available with greater strength and toughness. » » » Pins and bushings must combine surface hardness with toughness of core. Agathon Nickel Iron possesses these qualities to a high degree. » » » Forgings that are light, tough and uniformly strong, whatever the temperature variations, can be had in Agathon Alloy Steels. » » » These and many other special alloy irons and steels have been developed by metallurgists of Republic Steel Corporation to help the locomotive designer produce a more efficient locomotive. Make full use of them.

Toncan Iron Boiler Tubes, Pins, Plates, Culverts, Rivets, Tender Plates and Firebox Sheets • Sheets and Strip for special railroad purposes • Agathon Alloy Steels for Locomotive Parts • Agathon Engine Bolt Steel • Agathon Iron for pins and bushings • Agathon Staybolt Iron • Climax Steel Staybolts • Upson Bolts and Nuts • Track Material, Maney Guard Rail Assemblies • Enduro Stainless Steel for dining car equipment, for refrigeration cars and for firebox sheets • Agathon Nickel Forging Steel. The Birdsboro Steel Foundry & Machine Company of Birdsboro, Pa. has manufactured and is prepared to supply under license, Toncan Copper Molybdenum Iron casings for locomotives.

CENTRAL ALLOY DIVISION, MASSILLON, OHIO



REPUBLIC STEEL
C O R P O R A T I O N
GENERAL OFFICES  YOUNGSTOWN, OHIO



Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1933—CONTINUED

REVENUES AND EXPENSES OF RAILROADS														
MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1933—CONTINUED														
Name of road	Av. mileage operated during period	Operating revenues				Operating expenses				Operating ratio	Total	Net from railway operation	Net railway operating income, 1932	
		Freight	Passenger	(inc. misc.)	Total	Traffic	Trans- portation	General						
New York Connecting.....Oct.	20	\$197,613	\$210,506	\$10,552	\$8,320	\$28,269	\$838	22.8	\$47,979	\$162,527	\$86,609	\$163,873
New York Connecting.....10 mos.	20	2,212,005	2,314,951	126,809	74,264	263,126	8,785	20.4	472,984	1,841,967	1,116,978	816,569
New York Connecting.....Oct.	568	6,444,925	7,224,426	112,597	133,364	298,995	24,310	80.6	582,348	2,400,031	146,817	146,817
New York Connecting.....10 mos.	568	6,770,246	8,043,351	960,659	1,392,530	3,051,135	236,976	71.9	5,779,955	2,263,396	1,447,755	1,562,737
New York, Ontario & Western.....Oct.	2,184	6,388,362	138,707	6,720,004	411,809	1,396,717	108,317	1,369,048	192,331	51.9	3,488,671	3,231,333	2,896,600	2,685,745
New York, Ontario & Western.....10 mos.	2,222	55,075,858	1,203,717	58,035,844	5,433,352	11,052,977	1,098,618	12,714,379	2,108,619	56.0	25,526,865	19,182,093	20,543,646	14,150,356
New York, Ontario & Western.....Oct.	932	3,971,184	9,124	424,189	63,707	50,987	17,482	139,254	23,332	69.5	136,095	129,427	116,492	107,735
New York, Ontario & Western.....10 mos.	932	3,440,606	98,715	3,707,191	674,866	576,713	187,909	1,400,894	229,087	82.8	3,069,469	637,722	176,904	—186,741
Norfolk & Western.....Oct.	6,747	4,275,163	325,266	4,979,302	458,104	895,236	144,153	1,608,789	247,189	68.4	3,403,120	1,576,182	1,330,376	978,390
Norfolk & Western.....10 mos.	6,742	33,677,156	76,070	39,812,629	4,631,954	9,230,630	1,465,131	14,384,721	2,486,184	82.4	7,012,123	1,627,118	4,387,175	73,908
Norfolk & Western.....Oct.	382	165,932	70,070	233,741	33,807	50,604	4,185	138,721	14,384	88.3	32,057	32,057	14,969	73,908
Norfolk & Western.....10 mos.	404	1,286,555	814,650	2,393,309	329,703	462,267	45,685	1,302,744	141,164	95.2	2,278,020	115,289	—88,862	—224,221
Norfolk & Western.....Oct.	6,747	4,275,163	325,266	4,979,302	458,104	895,236	144,153	1,608,789	247,189	68.4	3,403,120	1,576,182	1,330,376	978,390
Norfolk & Western.....10 mos.	6,742	33,677,156	76,070	39,812,629	4,631,954	9,230,630	1,465,131	14,384,721	2,486,184	82.4	7,012,123	1,627,118	4,387,175	73,908
Norfolk & Western.....Oct.	382	165,932	70,070	233,741	33,807	50,604	4,185	138,721	14,384	88.3	32,057	32,057	14,969	73,908
Norfolk & Western.....10 mos.	404	1,286,555	814,650	2,393,309	329,703	462,267	45,685	1,302,744	141,164	95.2	2,278,020	115,289	—88,862	—224,221
Norfolk & Western.....Oct.	6,747	4,275,163	325,266	4,979,302	458,104	895,236	144,153	1,608,789	247,189	68.4	3,403,120	1,576,182	1,330,376	978,390
Norfolk & Western.....10 mos.	6,742	33,677,156	76,070	39,812,629	4,631,954	9,230,630	1,465,131	14,384,721	2,486,184	82.4	7,012,123	1,627,118	4,387,175	73,908
Norfolk & Western.....Oct.	382	165,932	70,070	233,741	33,807	50,604	4,185	138,721	14,384	88.3	32,057	32,057	14,969	73,908
Norfolk & Western.....10 mos.	404	1,286,555	814,650	2,393,309	329,703	462,267	45,685	1,302,744	141,164	95.2	2,278,020	115,289	—88,862	—224,221
Norfolk & Western.....Oct.	6,747	4,275,163	325,266	4,979,302	458,104	895,236	144,153	1,608,789	247,189	68.4	3,403,120	1,576,182	1,330,376	978,390
Norfolk & Western.....10 mos.	6,742	33,677,156	76,070	39,812,629	4,631,954	9,230,630	1,465,131	14,384,721	2,486,184	82.4	7,012,123	1,627,118	4,387,175	73,908
Norfolk & Western.....Oct.	382	165,932	70,070	233,741	33,807	50,604	4,185	138,721	14,384	88.3	32,057	32,057	14,969	73,908
Norfolk & Western.....10 mos.	404	1,286,555	814,650	2,393,309	329,703	462,267	45,685	1,302,744	141,164	95.2	2,278,020	115,289	—88,862	—224,221
Norfolk & Western.....Oct.	6,747	4,275,163	325,266	4,979,302	458,104	895,236	144,153	1,608,789	247,189	68.4	3,403,120	1,576,182	1,330,376	978,390
Norfolk & Western.....10 mos.	6,742	33,677,156	76,070	39,812,629	4,631,954	9,230,630	1,465,131	14,384,721	2,486,184	82.4	7,012,123	1,627,118	4,387,175	73,908
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A Self-Liquidating Project

An installation of "Union" Centralized Traffic Control on the Pennsylvania Railroad between Limesdale and Ben Davis resulted in the average freight train speed being increased 87 per cent, gross ton miles per train hour being increased 89 per cent, with an annual net return on the total investment of 28 per cent. A large investment for double tracking was indefinitely postponed.*

This is but one of the many self-liquidating installations of "Union" Centralized Traffic Control. Investigate its possibilities on your road.

* Signal Section A. R. A. Proceedings, March, 1932, page 52

Union Switch & Signal Co.
SWISSVALE, PA.

NEW YORK

CHICAGO

SAN FRANCISCO

MONTREAL

ST. LOUIS

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1933—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues				Operating expenses				Operating ratio	Net from railway operation	Operating income	Net railway operating income	Net operating income, 1932
		Freight	Passenger	Total (inc. misc.)	Maintenance of way and structures	Equipment	Traffic	Trans- portation	General					
New Orleans & Northeastern.....	204	\$156,450	\$16,746	\$173,196	\$24,071	\$22,394	\$5,536	\$66,234	\$9,413	68.3	\$59,781	\$28,629	\$11,185	\$27,378
10 mos.....	204	1,338,552	153,611	1,492,163	254,211	340,680	53,257	594,982	88,507	83.4	267,452	37,283	201,536	361,983
Northern Alabama	99	47,728	11,465	59,193	11,557	1,537	836	13,085	1,663	60.0	20,309	16,881	6,954	1,859
10 mos.....	99	411,942	12,158	424,100	90,364	13,239	10,196	139,981	16,951	61.6	168,555	124,261	13,702	88,644
Southern Pacific	9,011	7,579,946	1,322,371	8,902,317	756,054	1,574,990	247,768	3,304,871	526,094	67.3	3,194,513	2,743,367	2,353,597	1,775,020
10 mos.....	9,064	60,029,295	12,674,607	72,703,902	80,414,413	14,653,136	2,577,409	29,441,525	5,293,791	75.9	19,360,227	10,370,375	7,175,758	7,196,954
So. Pac. Steamship Lines.....	...	346,608	10,500	357,108	368,491	92,954	16,025	232,981	18,839	100.7	2,653	3,253	1,831	22,404
10 mos.....	...	3,280,957	126,002	3,406,959	3,564,026	987,956	159,924	2,408,940	200,350	109.0	330,226	338,452	328,728	771,969
Texas & New Orleans.....	4,487	2,087,889	220,873	2,308,762	340,465	519,795	109,320	883,859	204,932	78.2	577,069	337,491	136,697	111,412
10 mos.....	4,510	19,074,906	1,933,087	21,007,993	3,360,404	4,882,600	1,108,867	8,441,828	2,087,788	83.7	3,893,676	1,574,149	281,025	1,375,031
Spokane, Portland & Seattle.....	552	345,477	33,230	378,707	414,762	36,606	5,546	139,607	16,599	63.5	151,438	111,525	90,751	47,811
10 mos.....	552	3,110,490	338,801	3,449,291	344,397	459,854	59,616	1,268,011	170,860	74.4	1,512,445	796,948	681,297	336,625
Tennessee Central	287	151,885	3,950	155,835	166,106	28,050	4,524	52,774	9,191	73.8	43,565	40,185	21,615	38,796
10 mos.....	290	1,483,093	38,471	1,521,564	271,373	238,608	48,812	534,414	96,684	73.7	423,491	393,643	237,657	148,754
Term. R. R. Assn. of St. L.....	55	...	...	...	556,189	44,100	3,034	222,660	12,652	60.0	222,587	133,982	204,402	161,708
10 mos.....	55	...	...	...	5,182,369	329,949	31,273	2,146,463	150,226	59.1	2,118,909	1,241,055	1,906,669	1,081,743
Texas & Pacific.....	1,950	1,421,974	153,680	1,575,654	163,484	322,570	63,182	524,159	101,497	66.8	592,733	489,612	415,848	511,807
10 mos.....	1,950	13,415,783	1,396,088	14,811,871	1,677,996	2,996,033	613,455	5,129,123	1,034,056	69.5	5,092,006	4,071,558	2,939,356	2,818,402
Texas Mexican	162	50,456	817	51,273	11,154	14,090	2,820	24,848	6,600	101.3	2,432	745	7,552	17,799
10 mos.....	162	478,945	6,345	555,290	96,921	127,345	29,017	241,848	66,662	103.9	21,032	66,853	97,122	55,006
Toledo, Peoria & Western.....	239	157,907	12	157,919	40,285	11,625	14,795	37,555	7,332	69.6	48,805	42,703	26,128	32,296
10 mos.....	239	1,382,152	221	1,382,373	347,228	106,790	140,400	363,927	80,177	74.0	364,891	316,337	194,014	87,530
Toledo Terminal	28	...	...	...	51,268	9,032	4,252	22,629	3,881	76.8	11,887	3,871	19,582	26,595
10 mos.....	28	...	...	...	606,320	77,602	4,252	255,001	40,263	68.8	189,383	115,663	255,850	140,456
Union R. R. of Penna.....	45	...	...	...	486,793	81,416	134	184,346	14,575	82.7	84,215	75,621	106,770	67,852
10 mos.....	45	...	...	...	3,122,061	467,938	1,263	1,129,327	138,912	86.2	429,672	382,429	651,849	684,306
Union Pacific	3,767	6,225,825	539,248	6,765,073	7,250,449	1,833,397	95,393	1,877,967	254,128	53.8	3,350,136	2,785,966	2,287,267	2,898,156
10 mos.....	3,767	42,825,526	4,689,444	47,514,970	52,067,931	10,169,499	1,037,175	15,091,160	2,655,069	64.3	18,587,907	13,783,108	11,464,478	12,188,581
Oregon Short Line.....	2,504	2,180,863	141,348	2,322,211	173,036	271,167	27,480	738,234	88,869	53.9	1,224,210	931,659	781,058	707,394
10 mos.....	2,504	14,318,381	1,120,587	15,438,968	1,766,928	2,240,846	298,477	5,431,975	894,598	65.2	5,806,092	3,420,086	2,564,910	1,952,654
Oregon-Wash. R. R. & Nav. Co.....	2,295	1,072,577	102,719	1,175,296	179,215	154,247	43,342	518,326	77,594	75.3	320,973	172,950	45,642	78,249
10 mos.....	2,305	8,923,773	881,738	9,805,511	1,612,571	1,472,373	459,340	4,474,771	828,544	80.3	2,180,192	782,412	264,341	1,208,977
Los Angeles & Salt Lake.....	1,248	1,214,818	122,663	1,337,481	107,911	161,413	38,251	403,144	53,079	55.0	647,054	507,467	369,230	251,607
10 mos.....	1,249	9,341,633	1,218,253	10,559,886	1,366,662	1,663,514	411,382	3,499,549	567,817	67.6	3,724,453	2,473,129	1,287,988	1,468,121
St. Joseph & Grand Island.....	258	308,204	2,117	309,321	19,046	25,003	2,124	76,931	10,875	42.2	183,897	159,703	114,671	79,727
10 mos.....	258	2,080,364	27,940	2,108,304	229,012	263,339	21,794	645,909	116,597	58.5	907,097	758,989	502,348	294,353
Utah	111	92,664	...	92,664	14,931	33,822	524	17,729	4,873	77.4	20,986	12,097	8,757	33,906
10 mos.....	111	781,501	...	781,501	105,071	215,241	4,881	174,299	48,871	70.8	229,033	147,090	45,083	54,068
Virginian	619	1,070,999	3,743	1,074,742	86,896	215,241	15,902	206,588	24,130	48.7	576,461	451,459	322,281	510,021
10 mos.....	613	10,670,177	50,295	11,158,207	998,913	1,989,556	159,391	2,016,045	279,666	48.7	5,722,199	4,327,414	4,996,888	4,093,287
Wabash	2,465	2,840,849	177,553	3,018,402	389,889	559,707	126,515	1,157,706	126,446	73.3	863,469	755,671	404,744	446,461
10 mos.....	2,475	26,588,437	1,679,904	28,268,341	4,019,540	5,107,865	1,293,905	11,648,057	1,235,768	77.0	6,967,803	5,285,602	3,937,440	139,440
Ann Arbor	293	273,175	5,414	278,589	27,100	5,138	10,334	122,093	10,196	78.1	62,628	50,552	32,460	57,829
10 mos.....	293	2,377,664	24,785	2,402,449	270,281	458,071	105,457	1,054,304	95,334	79.5	511,945	370,686	189,539	26,986
Western Maryland	891	1,094,567	6,986	1,101,553	147,277	224,710	33,204	280,531	35,635	63.9	407,398	372,398	418,143	443,268
10 mos.....	891	9,837,674	77,053	9,914,727	1,362,610	1,881,133	314,098	2,551,804	358,793	63.6	3,709,982	3,044,982	3,294,782	3,018,780
Western Pacific	1,212	1,192,389	19,056	1,211,445	136,324	157,594	51,311	369,828	33,831	66.1	443,001	381,504	316,666	452,793
10 mos.....	1,211	8,242,542	254,053	8,496,595	1,425,056	1,610,187	545,589	3,213,786	349,955	82.2	1,592,881	852,997	667,580	572,146
Wheeling & Lake Erie.....	511	898,570	1,290	900,860	131,275	312,245	27,045	305,058	25,506	82.1	175,000	94,041	107,603	227,582
10 mos.....	511	8,501,766	14,986	8,516,752	938,984	2,426,285	262,527	2,529,671	249,956	70.5	2,676,938	1,738,897	1,592,927	543,631
Wichita Falls & Southern.....	203	56,575	337	57,112	8,644	7,083	1,801	12,106	3,561	56.82	25,240	22,497	19,942	14,831
10 mos.....	203	442,112	337	442,449	87,032	68,761	16,780	123,333	35,610	72.02	128,817	100,303	69,417	55,028